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Worldwide Report

NUCLEAR DEVELOPMENT AND PROLIFERATION

No. 33

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LIMITATIONS, PEACEFUL AIMS OF IRAQ NUCLEAR ACCORD WITH BRAZIL CITED

Government Affirms Peaceful Nature

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 22 Jan 80 p 5

[Text] Brasilia--The Presidency of the Republic yesterday forwarded to the national congress the text of the agreement on the peaceful use of nuclear energy between Brazil and Iraq. The text was accompanied by the explanatory covering memorandum of Foreign Minister Saraiva Guerreiro. The text of the agreement was not distributed to the press; only the covering memorandum was released.

Despite the fact that the agreement envisages extensive and intensive cooperation in nuclear matters between Brazil and Iraq, the covering memorandum defines the limits of that exchange. In paragraph 7, section c., the text states: "The cooperation envisaged does not include any possibility of the supplying of so-called "sensitive" material or technology such as the transfer of installations or know-how for the enrichment of reprocessing of uranium, or the supplying of uranium with a high level of enrichment."

According to the covering memorandum, "negotiation of the agreement was conducted in Rio de Janeiro at the end of November and beginning of December" between delegations of the two countries, the Brazilian delegation being headed by Ambassador Paulo Nogueira Batista.

According to the text, the negotiation took as its basis the "Memorandum for Cooperation on the Peaceful Uses of Atomic Energy" signed by the two countries in November 1979 on the occasion of the visit to Baghdad by a Brazilian delegation which included representatives of the Foreign Ministry, the Ministry of Mines and Energy, the National Security Council, the National Nuclear Energy Council (CNEN) and the Brazilian Nuclear Corporation (NUCLEBRAS).

Safeguards

That "Memorandum" delimited a number of areas for bilateral cooperation and envisaged the holding of future negotiations aimed at a specific agreement between the two governments. The areas mentioned in this document as possible

areas of cooperation were: uranium prospecting, supplying of fuel (lightly enriched uranium for use in Iraqi nuclear reactors), reactor safety, use of the international nuclear information system (of the IAEA), exchange of visits to research and development installations, and the conducting of scientific experiments and personnel training.

According to the "Memorandum," cooperation would be carried out according to the capabilities and priorities of each country and according to their respective international obligations, in addition to the application of the necessary safeguards.

The explanatory covering memorandum affirms also that bilateral cooperation "will proceed with the strictest respect for the international obligations of each (of the two nations), whether commitments toward the AIEA or obligations assumed in the context of other bilateral agreements." The text, however, envisages the possibility of Brazil exporting natural or lightly enriched uranium to be used as nuclear reactor fuel without the need for prior consultation with other countries.

Official Summary of the Text

According to the explanatory covering memorandum that accompanied the draft of the agreement, the full text of which was not released, the following are the main provisions:

"A--Bilateral cooperation will be carried out in accordance with the capability and the priorities of each party and in full conformity with the international commitments and obligations of each;

"B--The two parties affirm their support for the principle of nonproliferation of nuclear weapons and reaffirm their right to the development and application of nuclear energy for peaceful purposes;

"C--Bilateral cooperation will be carried out in the following areas:

"--survey of resources and prospecting and exploration of uranium;

"--supplying of natural uranium and uranium with a low level of enrichment, possibly in the form of fuel elements, for use in nuclear reactors;

"--supplying of equipment and engineering and nuclear reactor construction services;

"--reactor safety;

"--exchange of experiences on the use of the IAEA "International Nuclear Information System;"

"--exchange of visits to research and development institutions and the conducting of scientific experiments;

"--personnel training.

"D--The signing of agreements and contracts between institutions of the two countries for implementation of the bilateral cooperation provided for in the agreement is envisaged; such agreements and contracts will be subject to the approval of the two governments according to their respective practice and legislation;

"E--There are articles pertaining to the application of safeguards. The two governments pledge to inform the IAEA of the negotiation of the agreement for purposes of the application of the pertinent safeguards, according to the obligations assumed by each party toward the IAEA (Iraq is a signatory to the Treaty on the Nonproliferation of Nuclear Weapons), with reference to the materials and equipment subject to safeguards that may be imported by one party from the other; the retransfer by one party to a third country of any material or equipment supplied to it by the other party will be subject to the prior conclusion by the third country of a safeguard agreement with the IAEA of the same type as that applied to the material or equipment in question in the importing country;

"F--Other articles provide for the application of physical protection measures, the holding of annual meetings to review implementation of the agreement, the solution of possible controversies through diplomatic channels, the agreement to be valid for a period of 10 years subject to extension for successive periods of 1 year, and the possibility of denunciation, effective within a period of 6 months;

"G--It is also envisaged that it will go into effect only after the constitutional procedures of each country have been completed, which in Brazil, of course, requires the approval of the national congress."

Anti-Zionist Vote Opens Market

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 20 Jan 80 p 8

[Article by O ESTADO DE SAO PAULO correspondent Reali Junior]

[Excerpt] Paris--The support of the Brazilian Government in the United Nations for the resolution condemning Zionism and terming it a racist movement "opened the doors of the Arab countries to Brazil and represented a milestone in Brazilian relations with these countries," declared Iraqi Deputy Prime Minister Tareg Aziz in an interview granted to the Brazilian reporters who covered the visit of Governor Paulo Maluf to Baghdad.

One of the strongmen in Saddam Husayn's regime, Tareg Aziz revealed that the government of Iraq "greatly appreciated the position of the Brazilian Government with regard to the Arabs, recognizing their rights," and pointed out

that Baghdad considers it a matter of prime importance "not to strengthen relations with any country that does not adopt a position of justice with regard to the rights of the Arabs" and for that reason is interested in "maintaining in the current excellent relations with Brazil."

The nuclear cooperation agreement recently signed between the two governments, according to the Iraqi leader, falls in "the area of the use of [nuclear] energy for exclusively peaceful purposes and is a part of the desire for cooperation between the two parties." However, he refused to speak about the technical specifics of the document, especially with regard to the problem of the enrichment of uranium, arguing that the matter lies outside his purview.

8711
CSO: 3100

BRAZILIAN-IRAQI NUCLEAR AGREEMENT

Text of Agreement

PY292254 Sao Paulo O ESTADO DE SAO PAULO in Portuguese 25 Jan 80 p 5 PY

[Text] The following is the complete text of the agreement signed by Brazil and Iraq on the peaceful uses of nuclear energy: The governments of the Federative Republic of Brazil and of the Republic of Iraq, "on taking into account the memorandum for cooperation in the peaceful use of atomic energy that was signed in Baghdad on 1 October 1979, and considering that the Government of the Federative Republic of Brazil agrees to cooperate with the Government of the Republic of Iraq in the implementation of the aforementioned program, have decided to inaugurate this agreement for cooperation in the field of the peaceful use of nuclear energy.

"Article I. Bilateral cooperation in the field of the peaceful use of nuclear energy will be undertaken through the competent national institutions, i.e. the National Nuclear Energy Commission (CNEN) and the Brazilian Nuclear Corporation (NUCLEBRAS) for Brazil and the Atomic Energy Commission of Iraq for that country.

"Article II. The cooperation provided for in this agreement will be undertaken in accordance with the priorities of each of the contracting parties, and it will fully respect the international obligations and commitments that have been assumed by each of the governments.

"Article III. The contracting parties declare their support for the principle of the nonproliferation of nuclear weapons, and they stress their right to develop nuclear energy and apply it toward peaceful purposes in accordance with their respective national programs.

"Article IV. The cooperation provided for in this agreement will be undertaken in the following fields:

"A. The studies of the extent and workability of uranium reserves;

"B. Prospecting and exploration for and mining and processing of uranium;

"C. The supply of natural uranium and slightly enriched uranium (if possible in the form of fuel) for use in nuclear reactors;

"D. The supply of equipment and engineering and construction services for nuclear reactors;

"E. Security for nuclear reactors;

"F. Exchanges of experience and know-how in the use of the international system of nuclear information of the International Atomic Energy Agency;

"G. Exchange of visits to research and development institutions, including the carrying out of scientific experiments; and

"H. The training of human resources.

"Article V. The organizations mentioned in Article I will inaugurate readjustments and contracts for the implementation of this agreement in the fields of cooperation mentioned in Article IV. The adjustments will come into force with the exchange of diplomatic notes.

"Article VI. The contracting parties will inform the International Atomic Energy Agency about the negotiation of this agreement with the objective of applying the relevant safeguards, in accordance with the obligations contracted by each party with the agency, to the nuclear material and equipment that is subject to safeguards and that is to be imported by one of the parties from the other, thus insuring that such material and equipment will be used exclusively for peaceful ends.

"Article VII. The transfer by one of the contracting parties to a third country of any type of material or equipment supplied by the other contracting party and subject to safeguards will only take effect after the third country has concluded with the International Atomic Energy Agency a safeguard agreement of the same type as that applied to the importing contracting party for that material or equipment.

"Article VIII. Each contracting party will take the necessary measures, in its territory, for the physical protection of the material and equipment that were supplied to it within the norms of this agreement, including cases involving the transport of that material and equipment between the territories of the contracting parties.

"Article IX. The contracting parties will hold annual meetings, alternately in Brazil and Iraq, in order to evaluate the implementation of this agreement.

"Article X. Any type of controversy that may arise regarding the implementation of this agreement will be resolved through the diplomatic channels of the two countries.

"Article XI. This agreement will be valid for a period of 10 years, starting from the date on which the contracting parties exchange notes reporting that the respective internal procedures for its approval have been completed. This agreement may be extended for periods of 1 year and it may be terminated by either of the two contracting parties through a diplomatic note sent to the other contracting party; in this case, the termination will become effective 6 months after the date of the note.

"Article XII. This agreement will come into force as soon as the respective constitutional requirements have been complied with in each country, including the appropriate communication to this effect through the exchange of diplomatic notes.

"Article XIII. The text of the original agreement was written in English."

Enriched Uranium Exports Denied

PY292311 Sao Paulo O ESTADO DE SAO PAULO in Portuguese 26 Jan 80 p 3 PY

[Excerpt] Rio de Janeiro--The chairman of the National Nuclear Energy Commission [CNEN], Hervasio de Carvalho, has denied reports that Brazil will export uranium enriched by 20 percent to Iraq within the terms of the nuclear agreement that was signed recently between the two countries. Carvalho termed "as absurd a report of this nature, one that could harm Brazil abroad." The CNEN chairman explained that Brazil is incapable of manufacturing this type of uranium, which is highly enriched and used in research and for military purposes. According to Carvalho, only the United States and the Soviet Union are capable of exporting this type of uranium, as well as France, although this country manufactures only a small quantity for internal consumption. Brazil imports uranium enriched by 20 percent for use in research reactors such as Triga or Argonauta and in the IPEN (Nuclear Energy Research Institute) reactor.

The highly enriched uranium that is imported by Brazil in small quantities is under the control of international safeguards and all of it is accounted for. "When our industry is able to produce enriched uranium," according to Carvalho, "it will be uranium enriched by 3 percent, at most by 3.3 percent, such as that used in PWR reactors (light-water reactors)." Carvalho stressed that Brazil must export the aforementioned type of uranium to Iraq only when that country requests it. The CNEN chairman believes that a need for this type of uranium in Iraq will arise in approximately 13 years, after that country has developed the other phases of its nuclear program, as occurred in Brazil. He also said that this type of report, accredited to diplomatic sources, is highly harmful to Brazilian interests.

CSO: 5100

NEW BOOK ANALYZES NUCLEAR NONPROLIFERATION POLICIES

Paris POLITIQUE ETRANGERE in French No 2, Dec 79 pp 345-346

[Book review by Pierre Lellouche: "Postures for Nonproliferation, Arms Limitation and Security Policies To Minimize Nuclear Proliferation" by Enid Schoettle, published by the Stockholm International Peace Research Institute (SIPRI), Taylor and Francis, London, 1979]

[Text] The main value of this book by Enid Schoettle and published by SIPRI stems from the fact that it is one of the very few works on nonproliferation that deals directly with the real crux of the whole proliferation problem, namely the political and military motives that prompt nations to arm themselves with nuclear weapons.

In fact, we have noticed, these past few years especially, that almost all of the literature on nonproliferation, notably in the United States, has dealt with the technical and industrial resources and facilities necessary to the fabrication of nuclear weapons, and particularly with the connection between civilian nuclear programs and "diversion" to military purposes. This literature, moreover, is not unrelated to the Carter administration's nonproliferation policy which, based almost exclusively on strengthening "guarantees" and the ban on certain "sensitive" technologies, has in no way solved the problem of the nuclear intentions of certain countries (note, for example, the case of Pakistan).

In this context, Enid Schoettle's book is of very special interest, especially since the author stresses from the very first part of his analysis the primary role of concerns about security in all the nations that have already proliferated, as well as in those nations that reportedly could develop atomic weapons by and for themselves.

In the light of this concern about security and the political ambitions attached thereto, the author then attempts to determine to what extent a nonproliferation policy can respond to these concerns by guaranteeing the security of nonnuclear countries and by offering a gradual evolution toward an international system that is less discrimi- ory than at present.

Because of this, the author thus raises the question of the entire now standard connection between vertical proliferation--arms race between nuclear powers--and horizontal proliferation, i.e. expansion of the nuclear powers "club."

In attempting to meet these objectives, the author first reviews the different propositions advanced by American experts and then proposes a nonproliferation policy offering nonnuclear countries a series of security guarantees likely to convince potential proliferation to give up the military option.

In the final part of his study, the author reexamines in detail the Nonproliferation Treaty negotiations between 1965 and 1968 and shows how the nuclear powers--particularly the United States and the Soviet Union--systematically refused to guarantee the security of the nonnuclear countries (including India which eventually "proliferated" in 1974).

The author's claim that a real connection exists between vertical and horizontal proliferation is, of course, debatable. In fact, it is questionable whether the effort made by Pakistan, for example, to acquire atomic weapons is the consequence of the continual arms race between Moscow and Washington. From this viewpoint, Schoettle's study evokes only very imperfectly the security problems specific to each region of the world, problems whose impact is, nevertheless, a determining factor in many cases.

The fact remains, however, that this study is an important contribution to formulation of an international nonproliferation system through its doctrinal input relative to security motivations as well as its historical analysis of the Nonproliferation Treaty's basic deficiencies.

8044
CSO: 5100

BRIEFS

U.S., SFRY SIGN URANIUM AGREEMENT--In Vienna the International Atomic Energy Agency, the United States and Yugoslavia have signed an agreement on the deliveries of enriched uranium for the research reactor at the Jozef Stefan Institute in Ljubljana. The agreement was signed by Sigvard Eklund, director general of the International Atomic Energy Agency, and Novak Pribicevic and Roger Kirk, SFRY and U.S. ambassadors to Austria. [Text] [AU011641 Belgrade BORBA in Serbo-Croatian 31 Jan 80 p 7 AU]

FINNISH AID TO INDIA--Finland has offered India its technical knowhow in building nuclear powerplants. A memorandum on the subject was handed over to Commerce Minister Pranab Mukerjee during the third meeting of the India-Finnish Joint Commission which ended in New Delhi 15 February. The joint commission discussed the scope of expansion of trade between the two countries and identified areas for increasing Indian exports to Finland. [Text] [Delhi Domestic Service in English 0240 GMT 16 Feb 80 BK]

CSO: 5100

BRIEFS

EXPERIMENTAL FAST BREEDER REACTOR--Mito Feb 1 KYODO--Japan's first experimental fast breeder reactor Joyo at Oarai, southeast of here, started producing 75,000 kilowatts of thermal power Friday and is now capable of carrying out various nuclear radiation tests. The reactor was built by the governmental Power Reactor and Nuclear Fuel Development Corp in late 1974 to conduct radiation tests on nuclear fuel and materials and provide basic data for the next-stage construction of a prototype. Since attaining criticality in April 1977, capacity has been gradually increased. After a continual operation lasting 100 hours since late last month under the Science and Technology Agency's supervision, Joyo's thermal power output was increased from 50,000 kilowatts to the 75,000-kilowatt level Friday. It will be further raised to 100,000 kilowatts by mid-1981. [Text] [OW011255 Tokyo KYODO in English 1216 GMT 1 Feb 80 OW]

BREEDER REACTOR PROJECT BACKING--Tokyo Feb 7 KYODO--Japan's long-pending plan to build a prototype fast breeder reactor (FBR), a nuclear reactor that can fuel itself while producing fuel for other reactors, has been given a financial boost as two industries have agreed to share its huge cost, government sources said Thursday. The sources said that lengthy talks between the official power reactor and nuclear fuel public corporation and representatives of the electric power and nuclear engineering industries have resulted in agreement that the two industries will put up yen 60 billion and yen 20 billion respectively. The Japanese Government, under its fiscal 1980 budget, has earmarked an initial appropriation of yen 15,575 million to finance the const ction of the prototype reactor "Monju" ("Manjusri" in Sanskrit, the Buddhist god of wisdom). The government has also decided to put up an additional yen 63 billion over several years after fiscal 1980 to keep up construction financing. The corporation has now come to find it financially possible to go ahead with the plan by starting the construction work on the 300,000-kilowatt Monju, which has been preceded by the corporation's experimental 50,000-kilowatt FBR "Joyo" (Permanent Sun) built in 1976 and brought up to criticality in April 1977. [Excerpts] [OW071131 Tokyo KYODO in English 1117 GMT 7 Feb 80 OW]

CSO: 5100

BRIEFS

USE OF NUCLEAR ENERGY, COAL--Taipei, Jan. 28 (CNA)--Taiwan Power Co will try to refrain from using increasingly more expensive oil to generate electricity, but will use nuclear energy and coal instead, Chu Shu-lin, president of the state-owned company, said Saturday. At a press conference at the Economics Ministry, Chu said Taipower has mapped out a 10-year power generation plan calling for construction of more nuclear power plants and coal-fired generators with a total capacity of 16 million kilowatts. Chu estimated that by 1985 prices of crude oil may run as high as U.S. dollars 50 per barrel, adding that even at that price it would still be difficult to buy. Nuclear power plants accounted for Taipower's 15 percent power capacity last year [as received], and in 1985 the company's six generators of the nuclear power plants will combine to save U.S. dollars 300 million in production costs a year, Chu said. Taipower is also actively looking for sources of coal partly as an oil substitute. Recently, the company has planned to import clean coal from Australia. [Text] [OW280433 Taipei CNA in English 0252 GMT 28 Jan 80 OW]

CSO: 5100

USSR, CEMA TO BUILD NUCLEAR POWER STATIONS

LD212028 Hamburg DPA in German 0944 GMT 21 Jan 80 LD

[Text] Frankfurt--By 1990 the Soviet Union and the CEMA states intend to build about 150 nuclear power stations with a total capacity of between 140,000 and 150,000 megawatts. A report by the Association of German Electricity Boards (VDEW) stated in Frankfurt on Monday that by this time 25 percent of the USSR's energy requirements (as much as 33 percent in the European part of the Soviet Union) is to be produced by nuclear power stations. According to the VDEW, a plant for the assembly-line manufacture of nuclear power stations has been under construction since 1974 in the town of Volgodonsk between the Volga and the Don at a total cost of R2.7 billion. Standardized pressurized water reactors with capacities of 440 or 1,000 megawatts are to be produced there from 1981 onward at the latest. The VDEW stated that there are at present in the Soviet Union 27 nuclear power stations with a total capacity of around 10,000 megawatts. They meet between 4 and 5 percent of the energy requirements in the country. By 1990 about 110,000 megawatts are to come from nuclear power stations. According to the VDEW report, the largest Soviet nuclear power station with 6,000 megawatts is being built near Nizhnekansk in the southern Urals. According to the VDEW, the CSSR intends to meet about 20 percent of its own energy requirements, Bulgaria 50 percent and Hungary 25 percent with the aid of nuclear power by 1990. In the CEMA countries 35 nuclear power plants with a capacity of about 8,000 megawatts are said to be in operation today outside the Soviet Union. Of all the CEMA states, nuclear power stations are manufactured, apart from in the Soviet Union, only in the CSSR. The other council states are included in the plans as suppliers of equipment parts.

CSO: 5100

CEMA MEMBERS MEET IN MOSCOW ON NUCLEAR POWER

SFRY-CEMA Cooperation

LD012106 Belgrade TANJUG in English 0913 GMT 1 Feb 80 LD

[Text] Moscow, Feb. 1 (TANJUG)--Nuclear power plants with installed power of 37,000 megawatts all together should be built, as planned, in the European countries members of the Council of Mutual Economic Assistance (COMECON) and in Cuba until 1990. All European countries COMECON members and Yugoslavia, under an agreement signed at COMECON's 33rd session, are to participate in the production of equipment for the intended nuclear power plants.

In terms of production and deliveries from coproduction, this is the largest agreement so far within COMECON. About fifty industrial associations and enterprises from COMECON member countries and Yugoslavia are to participate in its realization.

The first nuclear power plant in the Soviet Union was built in 1960. Bulgaria, Czechoslovakia and the German Democratic Republic have such power plants now. One is being built in Hungary, and the construction of others is being prepared in Poland, Romania and Cuba.

Hungarian, Soviet Discussions

LD310050 Budapest Domestic Service in Hungarian 2100 GMT 30 Jan 80 LD

[Summary] The Moscow CEMA session has ended. "The head of the Hungarian delegation, Deputy Premier Gyula Szeker, had discussions with Soviet Deputy Premier Valdmir Novikov about putting the Paks atomic powerplant into operation on schedule, and how the Soviet suppliers can help the Hungarian constructors in fulfilling their plan."

CSO: 5100

BRIEFS

CZECHOSLOVAK DELEGATION TO MOSCOW--A Czechoslovak delegation left Prague for Moscow today to attend a meeting of the CEMA Intergovernmental Commission for Nuclear Energy Cooperation among CEMA countries until 1990. It is led by Josef Simon, deputy federal premier; the commission will discuss topical questions connected with the manufacture of equipment and the construction of nuclear power plants in CEMA countries. [Text] [LD282340 Prague Domestic Service in Czech and Slovak 1500 GMT 28 Jan 80 LD]

HUNGARIAN DEPARTURE FOR MOSCOW--Deputy Premier Gyula Szeker and Foreign Trade Minister Peter Veress have left for Moscow. Gyula Szeker is to take part in the session of the intergovernmental committee coordinating the cooperation of the CEMA countries' Committee for Nuclear Energy Machine Building. [Excerpt] [LD281835 Budapest Domestic Service in Hungarian 1600 GMT 28 Jan 80 LD]

CEMA NUCLEAR ENERGY TALKS END--A meeting of the council for scientific-technical cooperation in the field of fuel and energy ended in Marianske Lazne yesterday with the signing of a final protocol. The meeting was organized by the Czechoslovak Commission for Atomic Energy on the basis of the plan of work of the CEMA Standing Commission for Peaceful Utilization of Nuclear Energy. Specialists from Bulgaria, Czechoslovakia, Hungary, Poland and the USSR discussed for 4 days the development of the nuclear power industry until 1990 and its further development in CEMA member countries until 2010. It emerged from the deliberations that by 1990 Czechoslovakia's nuclear complex will possess 16 blocks, of which 12 will be of the Voronezh-440 type and 4 of the Voronezh-1000 type. [Text] [LD021114 Prague Domestic Service in Czech 0400 GMT 2 Feb 80 LD]

CSO: 5100

NUCLEAR INDUSTRY PROGRAM NECESSARY TO MEET ENERGY NEEDS

LD231343 Prague Domestic Television Service in Czech and Slovak 1800 GMT 22 Jan 80 LD

[Summary] The only way for Czechoslovakia to satisfy energy appetites is through the industrial assimilation of nuclear energy. By 1990 Czechoslovakia should have increased its generation of electricity by about 8,000-10,000 megawatts, and nuclear plants will then contribute about 30 percent of the total energy output.

This very demanding program is based on the 1970 and 1976 cooperation agreements between Czechoslovakia and the Soviet Union. Under these agreements nuclear power stations at Jaslovske Bohunice and Dukovany, with a total output of 3,500 megawatts, are already under construction and should be completed by 1985.

The next large powerstation is planned for the beginning of the Eighth 5-Year Plan at Mochovce in South Slovakia. This will be the last of our 440 megawatt units, following which the second stage, with 1,000-megawatt units fitted with a protection shield will be commissioned. These are currently under construction in the Soviet Union and by the time they are installed in our country they will have already been sufficiently tested in operation. At present the construction of these powerstations with 1,000 megawatt units is intended mainly for two places--Southern Bohemia and Northern Moravia. The decisive criterion for the location of power stations is, of course, safety. One of the strictest conditions is that the selected area should be seismologically stable.

CSO: 5100

BRIEFS

REACTOR PRODUCTION DELAYS NOTED--Capital investment of the sectoral enterprise SKODA Plzen is currently aimed at development of the production base on which the production of the VVER 440 and later VVER 1000 reactors is dependent. From this point of view, the completion of the reactor assembly plant is vital. According to the government plan, it is to be completed by the end of 1980. While last year the workers of the plant 04 ARMABETON Praha fulfilled the volume indicators of the plan, they lag in the actual fulfillment. [sic] From this point of view they started the year 3 months behind on the quenching pit construction. If the equipment assembly, which constitutes an unusually demanding stage of the overall construction, is not to be delayed, the ARMABETON builders will have to catch up by the end of April. [Excerpt] [Plzen PRAVDA in Czech 12 Jan 80 p 1]

FORGING PRESS FOR REACTOR--The construction of a 70 meganewton (MN) forging press in the KOVARNY plant is the basis for production of the nuclear reactor VVER 1000. It is a very complicated job because the forging shop reconstruction is taking place during continued full production. The capital investment total is Kcs 340 million while the building portion represents Kcs 150 million. The construction started in March 1977 and according to the government deadline it is to become operational in May 1982. However, the current delay is 6 months. The delays in the delivery of buildings have especially effected the construction of two new annealing furnaces which are replacing the furnaces which had to give way to the forge. The current status of the work on the forging plant construction is as follows: The new annealing furnace is to be operational by 20 January. Next stage of the construction will be the removal of the existing steel plant structure, construction of the new one and its shell. Only then the foundations for the forge itself and the accompanying furnace and other equipment will be built. Assembly of the 70 MN forging press is to start in 1981. [Excerpt] [Plzen PRAVDA in Czech 12 Jan 80 p 2]

NUCLEAR POWER PLANT PROGRESS--Based on the government established program of rationalization of consumption, conservation and use of all types of fuels and energy, the relative savings should reach at least 11 million tons by 1985, and 25 million tons of standard fuel by 1990, compared to the year 1980.

One way to achieve this goal is the extensive nuclear power complex construction in Jaslovske Bohunice. Just by bringing on line the V-1 unit, approximately 2 million tons of lignite were saved last year alone. Further savings will come about after the second unit becomes operational during the first half of 1980. Decisive for the operation of the first 440 MW V-2 unit will be the construction and engineering progress on this key project. The planned investment here is Kcs 1.24 billion which, compared to last year, is an increase of 100 percent. This breaks down into Kcs 482 million for the construction of remainder for the engineering portion. Presently, the work is concentrated on the main production unit--engine room, electrical installations, and the reactor building. The heart of the first unit--the reactor building--is at the stage of completely the 2.5-meter thick outer shell of the hermetic portion of the reactor and the work continues on the reinforced block for the reactor shaft. [Text] [Bratislava HLAS LUDU in Slovak 19 Jan 80 p 3]

CSO: 5100

CASTRO MADERO DISCUSSES NUCLEAR ACCORD WITH BRAZIL

PY010035 Buenos Aires NOTICIAS ARGENTINAS in Spanish 1435 GMT 31 Jan 80 PY

[Text] Buenos Aires, 31 Jan (NA)--Vice Adm Carlos Castro Madero, chairman of the National Atomic Energy Commission (CNEA), said that "we will not view the visit Brazilian President Joao Baptista de Figueiredo will make to Argentina in May as a deadline" for the signing of the nuclear agreement between the two countries. He noted that the agreement could be signed "before or after" the visit.

Castro Madero, who made a statement to a reporter shortly after returning from his visit to Brazil, said that the agreement "will be implemented in stages."

He added that, following his visit to Brazil, "the next steps" will be the visits of Hervasio Carvalho and Paulo Nogueira, presidents of the Brazilian Nuclear Energy Commission and the Brazilian Nuclear Corporation, respectively, "to have a firsthand view of the development of the Argentine nuclear plan."

Castro Madero pointed out that "the two visits will be instrumental in setting up an effective, concrete plan of action which would not consist of mere words or rhetoric."

The CNEA president also expressed his "great surprise" over remarks attributed to him concerning the Argentine position on the U.S. grain boycott against the Soviet Union. He pointed out that he did not make such remarks because "I am not the one who should discuss" the subject.

CSO: 5100

NUCLEAR ACCORD BETWEEN BRAZIL, ARGENTINA ENVISIONED

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 20 Jan 80 p 8

[Article by O ESTADO DE SAO PAULO correspondent Hugo Martinez]

[Text] Buenos Aires--The chairman of the Argentine National Atomic Energy Commission (CNEA), Vice Admiral Carlos Castro Madero, will go to Brazil on the 28th of this month to make contacts with a view to a possible nuclear cooperation agreement.

Speaking to O ESTADO, Castro Madero said that he will go to Vienna Tuesday to attend the meeting of the International Atomic Energy Association (IAEA) and then will come to Brasilia where he will meet with the foreign minister and the minister of mines and energy as well as with the president of the Brazilian Nuclear Corporation (NUCLEBRAS) and the chairman of the National Atomic Energy Commission.

Castro Madero denied that any agreement will be signed with Brazil during his visit: "They will be initial contacts with a view to later negotiation of agreements between the two countries." Confirming that statement, Argentine diplomatic circles comment that nuclear cooperation agreements will be signed only when President Figueiredo goes to Buenos Aires in May.

The chairman of the CNEA said also that his schedule in Brazil includes: on the 28th, visits to the Pocos de Caldas uranium plant and the Angra dos Reis nuclear power plant project; on the 29th, there will be a visit to the NUCLEBRAS Heavy Engineering Corporation (NUCLEP) industrial headquarters; and on the 30th, the meeting with the chairman of the National Atomic Energy Commission (CNEN) in Rio. On that same day, Castro Madero will leave for Lima where he will attend the ceremony of laying the cornerstone of a nuclear plant in which the CNEA is participating.

In the area of nuclear policy, there are many common points between Brazil and Argentina that can produce important political ties between the two countries and broaden the margin of possible nuclear agreements. In that connection, the visit which President Joao Figueiredo will make to Argentina in May is considered very important, 35 years after Getulio Vargas went to Buenos Aires on the last visit by a Brazilian president to that country. Figueiredo's visit has special significance which the Argentine Foreign Ministry made it a point to emphasize.

It so happens that the coincidence of points of view of the two countries gives a new dimension to the political game of the continent. Observers believe that that coincidence may serve as an example for all South America. In addition, there is the economic importance inasmuch as Argentine officials consider the Argentine and Brazilian markets to be complementary.

The refusal of the two countries to adhere to the boycott in the sale of grain to the Soviet Union requested by the United States is another point considered important by the Argentine Government. Thus, according to Argentine officials, there will be an economic rapprochement that can be effective if the United States increases its pressures to impede the transfer of nuclear technology.

Proximity will also facilitate the prospect of future nuclear agreements, which Argentina is determined to reinforce as is proved by its nuclear presence in Peru where it is implementing an important atomic cooperation agreement.

8711
CSO: 5100

CAL ACTS TO SPEED UP CONSTRUCTION OF ATUCHA III

Buenos Aires CONVICCION in Spanish 24 Jan 80 p 13

[Text] By means of Law 22,142, published yesterday, the national executive branch has stated that construction and placing in operation of a heavy water plant in Arroyito, Neuquen Province, is in the nation's interest, and by means of Decree 115, also published yesterday, it empowers the National Atomic Energy Commission (CNEA) to appoint and contract for the personnel required for the job and to take the steps needed for ensuring construction of the plant.

In addition, the Legislative Advisory Commission (CAL) has issued a definitive opinion on the bill declaring that construction of the third nuclear powerplant, Atucha III, and production of nuclear fuel in the Ezeiza Atomic Center are in the nation's interest.

Law 22,142, which applies a criterion similar to the one used when Law 20,498 was promulgated, approved to allow adequate flexibility in construction of the nuclear powerplant built at Embalse Rio III, in Cordoba, took into account the experience acquired at that time. Thus, it includes rules pertaining to advancing funds, obtaining credits, power to expropriate any property that may be necessary, greater administrative flexibility in contracting for specialized personnel, establishment of administrative and technical sectors, special customs inspection system and the law's executive agency.

In the preamble of the draft finally approved, approval of the law is regarded as indispensable, in order to make it possible to come into possession of a suitable instrument for regulating construction of the heavy water plant at Arroyito, in Neuquen, which is "an essential factor in the development of the Argentine Nuclear Plan."

After delcaring that construction and placing in operation of the heavy water plant at Arroyito is in the nation's interest, articles in the law authorize the executive branch to order advances of funds, subject to reimbursement, that may be required during the course of construction, when the investment requirements exceed the actual assignment of funds.

Article 3 of the law empowers the National Atomic Energy Commission to negotiate, with participation by the Ministry of Economy, credit transactions for the purpose of obtaining funds required for constructing and placing in operation the above-mentioned plant from Argentine, foreign or international banks and agencies and from suppliers of goods and services.

The CNEA is also empowered to make execution of the tasks connected with the construction and placing in operation of the plant independent administratively. Thus, the commission may, by adhering to the manner specified by the executive branch in regulatory Decree 115, contract for personnel required or assign already existing personnel and establish administrative and technical sectors, liaison agencies and agencies for inspecting accomplishment of the jobs both in Argentina and abroad and send and receive personnel required for better fulfillment of those functions.

In another provision, the law specifies that the executive branch will grant the nation's guarantee to obligations contracted by the CNEA in matters of credit transactions for obtaining funds, for the amounts and under the terms authorized beforehand, at the same time as it will guarantee means so that the CNEA may meet commitments made and obtain financing for goods and services coming from abroad as well as availability of and authority to draw the foreign currency in which payment must be made.

Farther on, the law stated that real estate and other property that may prove necessary for construction, maintenance and operation of the plant to be set up in Arroyito, Neuquen Province, are in the public interest and subject to expropriation. Once the property to be expropriated has been specified by the executive branch, it will authorize the CNEA to institute the pertinent expropriation proceedings and to take possession of the expropriated property.

Finally, and after assigning to the executive branch power to set up a special system of customs inspection and on site shipment, for importation by sea, river, land or air of items connected with construction of the plant, the law specifies that the National Atomic Energy Commission will be the executive agency of the rules approved and, consequently, will assume responsibility for everything concerning planning, contracting, executing, inspecting and accepting the construction job. With regard to the contract with the company awarded the construction job, it will have to be submitted for approval by the executive branch.

Regulatory Decree 115, in turn, specifies in more detail the scope of the legal provisions approved. Thus, among the powers granted by the law to the CNEA to appoint and contract for personnel, the decree empowers the commission to set up branch offices abroad for the time required for administering, coordinating and inspecting the work. It may send directly abroad, likewise, transfer or receive from abroad personnel regarded, in its opinion, as necessary, reporting this semiannually to the executive branch.

Next, the decree states that equipment, machinery, material and components imported for the heavy water plant by the CNEA or the company awarded the contract for the job must be sent directly on site. It specifies, in this connection, the special procedures to which the above-mentioned items will be subject on importation into Argentina and it imparts pertinent instructions both to the CNEA and to the National Customs Bureau.

Finally, inasmuch as the National Atomic Energy Commission will be the executive agency of the law for which rules are given, the decree provides that the chairman of that commission will be responsible for signing all the necessary documentation.

Concerning the draft returned by the CAL to the executive branch for approval, it states that all the activities of design, construction, acquisition of goods and services, assembly, placing in operation, acceptance, operation and maintenance of Atucha III nuclear powerplant, as well as the supplementary facilities for producing nuclear fuel in the Ezeiza Atomic Center are in the nation's interest.

In addition, the CNEA announced yesterday, by means of a communique, that on 24 and 25 January, its chairman, VADM Carlos Castro Madero, will participate in another meeting with the Scientific Advisory Committee of the International Atomic Energy Agency [IAEA] in Vienna.

As will be recalled, Castro Madero was selected to be a member of that very select advisory body -- the communique states -- on occasion of the meeting of the Board of Governors of the above-mentioned International Atomic Energy Agency, held in February 1979.

That committee consists of 15 scientists from all over the world, acting in a personal capacity to advise the director general of the IAEA on policies and research programs conducted by that agency.

10,042
CSO: 5100

DETAILS ON THE NEUQUEN HEAVY WATER PLANT REPORTED

Buenos Aires LA PRENSA in Spanish 24 Jan 80 pp 1, 9

[Report on Executive Branch Decree 115, no date given, authorizing Argentina Atomic Energy Commission to take steps to build a heavy water plant]

[Text] By means of Decree 115, the national executive branch has authorized the National Atomic Energy Commission to take steps required for carrying out adequately construction of the heavy water plant in Arroyito, Neuquen Province. At the same time, by means of Law 22,142, its construction and placing in operation is declared to be in the nation's interest, because it is regarded as "being an essential factor in the development of the Argentine Nuclear Plan," according to an official report.

In accordance with Decree 115, the National Atomic Energy Commission is granted "the power to appoint and contract for the necessary personnel required to perform construction, placing in operation and operation until final delivery of the heavy water plant to be set up in Neuquen Province and to specify the working conditions to which it will be subject, making an annual report to the executive branch."

Branch Offices

"The National Atomic Energy Commission may set up branch offices abroad during the time required for administering, coordinating and inspecting the work being performed in fulfillment of the plant construction contracts" and "it may also send directly abroad, transfer or receive from abroad whatever personnel may be needed, in its opinion, for administering, coordinating, planning and inspecting general or specific aspects of the construction work, making a semiannual report to the executive branch."

The third article in the decree states that "direct shipment of equipment, machinery, material and components imported by the National Atomic Energy Commission or the company awarded the contract for constructing the heavy water plant for this plant must be made on site."

Importation of Goods

The fourth article of Decree 115 states that "importation of goods will be made by the system of on site shipment on request. In spite of this, the one performing the services must declare the merchandise in accordance with the Tariff List and Customs Duties (NADI)."

The fourth article specifies that "for purposes of compliance with article 13 of Decree 5344/64, the National Atomic Energy Commission or the contracting company must submit certificates for imports that they make" for construction of the plant "within a 90-day period counting from the date of shipment of the merchandise involved to the site."

With regard to customs inspections, the ninth article specifies that "they will be made in the ports and airports of arrival of the materials for all goods admitting of proper, exhaustive inspection. When this is not possible, owing to their quantity, variety, volume or weight, inspection will be made directly at the facilities of the heavy water plant, in Neuquen Province, where the goods will be taken under appropriate guard.

Article 11 states that "everything pertaining to contracting, planning, execution and inspection of the construction job will be the responsibility of the National Atomic Energy Commission as executive agency of the pertinent law." The chairman of the commission is responsible for signing the necessary documentation.

With regard to the contract with the company awarded construction of the heavy water plant to be set up in Neuquen, "it must be submitted for approval by the executive branch."

National Interest

With regard to the law declaring accomplishment of the job to be in the nation's interest, it includes rules pertaining to advancing funds, obtaining credits from Argentine, foreign and international agencies, power to expropriate property that may be necessary, greater administrative flexibility for contracting specialized personnel and a special system of customs inspection.

It is specified in the message accompanying the law that its approval "is regarded as indispensable and that it will make it possible to come into possession of a suitable instrument for regulating construction of the heavy water plant, which is an essential factor in the development of the Argentine Nuclear Plan."

10,042
CSO: 5100

BRIEFS

CONSTRUCTION OF ATUCHA II--During 1980 Argentina will begin construction of the second nuclear plant at Atucha, in the Province of Buenos Aires--in keeping with its reputation as one of the most developed countries in the nuclear field. According to the Latin American Embassy Organization (OLADE) Atucha II will begin operation in 1987. [Excerpts] [PY251914 Buenos Aires LA RAZON in Spanish 23 Jan 80 p 5 PY]

CSO: 5100

FOREIGN MINISTER: WE DO NOT WANT NUCLEAR WEAPONS

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 17 Jan 80 p 5

[Excerpt] Lima--"Brazil does not have nor does it plan to have nuclear weapons because they add nothing to the country." That statement was made yesterday by Foreign Minister Saraiva Guerreira, who is in Lima for a 2-day meeting with his Andean Pact colleagues.

At the same time, the foreign minister revealed that the Brazilian Government wants to furnish arms of various types to Chile. That sale is intended to supply that country, which has been hit by a U.S. embargo on furnishing military materiel.

Saraiva Guerreiro declared also that Brazil recognizes the "legitimacy and justice" of Bolivia's position with regard to an outlet to the Pacific Ocean. He pointed out that that Brazilian position is similar to that of all the countries in the continent and stressed that Brazilian support "has nothing to do with our interests in the eastern region of Bolivia."

At the opening of the first working meeting between Brazil and the Andean countries (Bolivia, Colombia, Ecuador, Peru and Venezuela), Saraiva Guerreiro asked the Latin American countries for "a long-range effort to mobilize and coordinate the action of the region of the North-South dialog as a basic step to reform and stimulate political relations in the Southern Hemisphere."

He pointed out the importance of integration but stressed that in addition to that "it is necessary to seek bilateral understandings which will bring about a continental understanding."

Brazil, said Saraiva, wants the discussions to continue on tariff negotiations, trade exchange and economic cooperation, the development of transportation and communications and scientific and technological exchange among Latin American countries.

According to him, Latin America has three major issues to discuss: peace, development and democracy. "In that sense," declared Saraiva Guerreiro, "the Brazilian Government considers it a permanent duty to contribute to the maintenance of a climate of peace, relaxation of tensions and mutual trust among the countries of the region."

8711
CSO: 5100

CITING COSTS, ARTICLE URGES REVISION OF NUCLEAR PROGRAM

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 17 Jan 80 p 3

[Editorial]

[Text] At a meeting of the Superior Energy Council, the chairman of the National Nuclear Energy Council (CNEN), Hervasio de Carvalho, announced that the first tests of Angra-1 with fuel will begin in midyear, acknowledging that the plant may go into operation in early 1981. Although he stated that, compared with other projects of the same size built abroad, Angra-1 will not suffer significant delays, the truth is that the original timetable envisaged its conclusion in March 1976. Thus, if it actually goes into operation in 1981, there will have been a real delay of 5 years.

It is well here to ask the chairman of the CNEN how much that will cost the country. It is known that an installed kilowatt from Angra-1 was being estimated at $500 and that the successive readjustment of prices stemming from domestic and foreign inflation of financing costs and the revision of projects and plans caused a substantial increase, with that figure now being around $1,500. That is an excessively high price. In other terms, the real delay of Angra-1 will represent an extra expenditure in the order of at least $1,000 per installed kilowatt, not counting the cost of generating its energy, which will depend not only on high operation and maintenance but also the purchase of enriched uranium at rising prices.

At the same meeting, the chairman of CNEN announced that the various cost figures for reinforcement of the foundations of Angra-2, at a standstill since last June, are being studied. In the meantime, the Brazilian Nuclear Corporation (NUCLEBRAS) continues its negotiations with KWU and the German banks for the implementation of Angra-3, which will also be delayed 4 to 5 years at the minimum.

While on the one hand, those delays, especially of the third unit, may present positive aspects because they will postpone to a more opportune phase investments we cannot make today or financial commitments we should not assume, in addition to making possible a complete revision of the program, on the other

hand, the constant rise of costs does not fail to cause concern. As a matter of fact, government experts are uneasy about the successive readjustments made by KWU, on various pretexts, ranging from reformulation of plans to the rise of the inflation rate. Those same experts admit that the costs of Angra-2, still in the initial stage of construction, are already around $2,500 per kilowatt and that when it is completed, Angra-1 will have cost at least $1,700 per kilowatt compared to a prediction of $500. For Angra-3, there are not even estimates.

The information given by the chairman of the CNEN do not fail to cause concern because the Angra-2 and 3 units, each of 1,300 KW [as published], will definitely cost the country at least $3,000 per kilowatt compared to $1,000 or $1,200 for the hydroelectric plants and a maximum of $2,000 for conventional coal-fueled thermal plants, which will generate energy with national fuel that has no market today. In the present economic-financial situation, President Jaoa Figueiredo should take advantage of those facts to restudy the nuclear program from the new angle. Finally, now we know that it is not essential for our energy supply and we have an approximate and even underestimated idea of its very high cost to the national economy.

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CSO: 5100

DATA ON ANGRA-2 FOUNDATIONS TO BE REASSESSED

Sao Paulo FOLHA DE SAO PAULO in Portuguese 8 Jan 80 p 6

[Text] Rio--The detailed study on reinforcing the Angra-2 reactor building presented by KWU to the National Nuclear Energy Commission (CNEN) is going to be recalculated to broaden the options, sector sources reported yesterday.

That will delay for 2 months, at the minimum, up to the end of February, the final decision of the CNEN licensing the foundation project, without which the reactor building project will remain at a standstill. Although work continues on the other buildings on Angra-2, the reactor building is in the "critical way" of the project, determining the general pace of construction of the plant.

According to official information, of the five options suggested by KWU for reinforcement, the CNEN and Furnas opted for the combination of reinforcing the heads of some piles with the construction of floating piles.

The requirement for new calculations is going to delay the beginning of construction of the heading slab for the piles, set by the last official prediction for March with the period for conclusion of the work estimated at 6 months (August). As a result of the new calculations, only the slab will be concluded by the end of this year, also delaying the Angra-3 project. According to the "optimum phasing" calculated by Furnas for the simultaneous construction of Angra-2 and Angra-3, the work on the third unit is supposed to begin with the conclusion of the heading slab. That situation makes it even more likely that the beginning of Angra-3 will be delayed until 1981.

The discussions pertaining of the reinforcement of the foundations of Angra-2 began at the end of 1978 and occupied experts of Furnas, KWU, the NUCLEBRAS Engineering Corporation (NUCLEN) and the CNEN, in addition to foreign consultants, for 6 months. After the reinforcement for safety reasons was decided upon, KWU presented several options at the end of 1979 and detailed those that were selected, recently submitting the calculations to the CNEN and Furnas.

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CSO: 5100

FURNAS BUDGET CUT TO IMPACT ANGRA-2 CONSTRUCTION

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 29 Jan 80 p 26

[Text] Rio--The cut in this year's Furnas budget will have an impact on the Angra-2 nuclear plant project, already slowed down substantially due to problems with the foundations, an electric sector technician revealed in Rio yesterday. The reason being that priority will be given to the projects that are going to tie into the commercial circuit in the next few years to guarantee the supply of electric power, with investments being concentrated later on the plants that are scheduled to go into operation at a later date.

It is an economic decision rather than a political one, said the technician, because the big projects require a lot of money and this year the order is to spend little. Therefore, even though Furnas has asked for a budget of 60 billion cruzeiros, the source believes that the company perhaps will not even get 40 billion cruzeiros, according to the predictions of the company's president, Licinio Seabra.

As occurs every year, discussion on the budget of the subsidiaries will go on for another 3 months until a decision is reached. As a result, the projects are [not] being touched until the necessary funds are available. Instead of first completing one project then distributing the energy to generate more funds, the sector is left with half-completed projects, thus jeopardizing the energy supply.

Beginning in 1982, a research drought may create electric power supply problems and if the market grows beyond expectations the situation will tend to become aggravated, said the technician.

After the Salto Santiago and Foz do Areia plants go into operation this year, the power of the first Itaipu generators will not tie into the commercial circuit until 1983. But nobody knows yet if there will be enough time to build the direct current circuits by the entrance into operation of the first 50-cycle generators.

8711
CSO: 5100

ECOLOGISTS DENOUNCE CONSTRUCTION OF NUCLEAR PLANT

PY251658 Sao Paulo Radio Bandeirantes Network in Portuguese 1000 GMT 25 Jan 80 PY

[Text] Sao Paulo ecologists have denounced the construction of the fourth nuclear plant in Brazil. Reporter (Nilton Flora) now gives more details on the subject. [Begin (Flora) relayed report] Ecologists have reported that the state government, through the Sao Paulo Power Plants [CESP], has secretly begun the construction of the fourth Brazilian nuclear plant on the southern coast of Sao Paulo, 11 km from (Peribe).

[Question] What would this involve, (Waldemar Paioli), secretary of the commission for the defense of the community's patrimony?

[Answer] Well, the damage is great and irreversible. The greatest damage would be the contamination of the atmosphere through the radiation which could leak through the walls. The other damage would be the contamination of the water along the coast from north to south affecting approximately 80 kilometers, in addition to the [words indistinct] of the region.

[Question] Mr (Paioli), could you prevent this construction through some kind of action?

[Answer] We intend to mobilize all the Sao Paulo population against this monstrosity, which is a real weapon with the trigger cocked and aimed at the population of Sao Paulo. We cannot allow a place like our state, which is densely populated, to become the victim of such a monstrosity. The commission and other groups for the defense of the atmosphere are beginning to organize an ecological march to the site where the pillars have already been installed by CESP, and where we know the fourth nuclear plant will be built. There we will begin our protest with judicial actions against the officials responsible for this act, with which we absolutely disagree. [end relayed report]

CSO: 5100

PRESS REPORTS ON FOURTH NUCLEAR PLANT SITE, CONTRACT

Sao Paulo Site

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 25 Jan 80 p 33

[Text] The fourth Brazilian nuclear plant will be built in Sao Paulo—very probably on the northern coast, in the Rio-Sao Paulo axis. The Brazilian Electric Power Corporation (ELETROBRAS) has already made that decision, according to very reliable sources from that sector interviewed by O ESTADO. However, the request for licensing has not yet been made to the National Water and Electric Power Department or the Nuclear Energy Commission (CNEN) because it is not yet known who is going to build it, which reportedly is also holding up the announcement of ELETROBRAS' decision.

The procedure adopted up to now indicates that the Sao Paulo Power Company (CESP) would be assigned the responsibility for building the fourth atomic plant, with the concession being granted to it by ELETROBRAS, the state holding company. But it so happens that the Brazilian Nuclear Corporation (NUCLEBRAS), another state holding company for the nuclear sector, is trying to convince Mines and Energy Minister Cesar Cals to transfer to it responsibility also for the construction of the plants which, after completion, would be turned over to the concessionaires of ELETROBRAS. At the present time, through its subsidiary NUCLEBRAS Engineering Corporation (NUCLEN), NUCLEBRAS is responsible for the plan. The management, construction and operation are the responsibility of the ELETROBRAS concessionaire, in the case of Angra-2 and Angra-3 that concessionaire is Furnas Power Plants.

NUCLEBRAS wants to assume responsibility for the "turnkey" delivery of the atomic plants, arguing--according to the source--that it would be in a position to train in its subsidiaries high-level, permanent personnel specialized in building, planning and managing the establishment of the power plants. This permanent team would obviate the need for each of ELETROBRAS' various concessionaires to train their own team at high cost and unnecessary expense, as they were given the concessions. Furnas, for example, already has specialized personnel and if the fourth plant is

given to the Sao Paulo Electric Company (CESP), the Sao Paulo concessionaire will have to make a huge investment in personnel. And that will occur in the future with the Northern Electric Power Plants (ELETRONORTE), Southern Electric Power Plants (ELETROSUL) and the Sao Francisco Hydroelectric Company (CHESF).

NUCLEN To Study Site

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 31 Jan 80 p 36

[Text] While announcing yesterday that NUCLEN will shortly receive the assignment to make a detailed study of the site of the fourth Brazilian nuclear plant, the president of NUCLEBRAS, Paulo Nogueira Baptista, refused to talk about the present stage of negotiations to contract for that plant. He said only that the NUCLEBRAS Heavy Equipment Corporation (NUCLEP) plant in Itaguai will begin to build the equipment for the next unit in March or April of this year.

Minister Denies Fourth Plant

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 1 Feb 80 p 1

[Text] In Rio yesterday Mines and Energy Cesar Cals refuted NUCLEBRAS president Paulo Nogueira Batista, who held a press conference Tuesday to announce contracting of the fourth Brazilian nuclear plant. The minister said that the fourth plant has not yet been contracted although the program calls for another plant this year. Cesar Cals announced also that neither the site nor the concessionaire have been chosen because the studies are still being conducted by the Ministry of Mines and Energy. According to him, only later will ELETROBRAS, the CNEN and NUCLEBRAS be asked to participate in the studies.

Governor Will Decide

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 1 Feb 80 p 24

[Text] It is Governor Paulo Salim Maluf who must decide if Sao Paulo will or will not have a nuclear power plant because it is a "political matter," the president of the Sao Paulo Power Company, engineer Francisco Souza Dias, said yesterday. The CESP does not have any nuclear program in its plans, he continued, and the company "will even be in trouble if it is forced by the federal government to assume the responsibility of building one."

Until now, at least, the CESP has not received any communication or consultation in that regard. If that should occur (as is expected shortly) the matter will go to Paulo Maluf.

8711
CSO: 5100

NUCLEBRAS THORIUM RESEARCH DISCUSSED

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 28 Jan 80 p 32

[Text] The Brazilian Nuclear Corporation (NUCLEBRAS) is conducting research on the use of thorium together with enriched uranium in the fuel element of light-water reactors being built in Brazil, the company's director of Mineral Resources Research, John Albuquerque Forman, revealed yesterday.

That way, the use of our thorium reserves, today estimated at 2,500 tons with an average assay of 5 percent, would indirectly increase the uranium reserves, which total 215,000 tons. The thorium-cycle has not been mastered yet but it is known that it will be possible to use it in the next generation of reactors, the fast-breeders.

The research is being carried out by the Energy Research Institute of Sao Paulo (IPEN) in an agreement with Germany, signed during the visit of President Geisel in March 1978. The long-term agreement with the Nuclear Research Center of Jullich complements the industrial cooperation agreement that already exists between the two countries. The two institutes work independently, merely exchanging information about research with gas-moderated and high temperature reactors and super-regenerators. In addition to the use of uranium associated with thorium, they are also studying the use of uranium together with plutonium.

Up to now, the only commercial use of thorium is in the form of nitrate in the manufacture of mantles for gaslights or kerosene lamps. The defunct Thorium Research Group also had ended up by adopting natural uranium because of the know-how of its fuel-cycle, according to Forman.

The director of NUCLEBRAS revealed that if the 215,000 tons of uranium were exported already enriched, it would represent exchange in the order of $33 billion at a price of $1,300 per ton. Thirty percent of the reserves are lost in the process itself, with only 25,083 [as published] tons being left after the enrichment process.

Despite the fact that the budget for the mining sector has not yet been released, Forman expects a real increase of 15 percent over last year,

which means appropriations in the order of 800 million cruzeiros. According to Forman, the exploitation of a uranium mine is only economically viable at a cost of $80 per kilo. However, in case of emergency, mines can be worked at a cost of $130 per kilo. The cheapest Brazilian reserves to work are those of Itataia in Ceara, where the uranium is associated with phosphate, thus dividing the cost with the exploitation of that component.

Brazil can export enriched uranium to any country as long as there is a surplus and after consultation with the president of the republic and the National Security Council. The nuclear agreement with Germany does not prohibit export of the product generated with the technology sold to Brazil.

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UNICAMP EXPERIMENTALLY PRODUCES HEAVY WATER, ENRICHED URANIUM

Rio de Janeiro JORNAL DO BRASIL in Portuguese 16 Jan 80 p 16

[Text] Sao Jose dos Campos, SP--The production of heavy water and the techniques of enrichment of uranium are no longer secrets for Brazil since a team of scientists from the State University of Campinas (Unicamp) experimentally developed its own methods and is now studying the feasibility of the industrial process for the generation of nuclear energy using those two systems.

The [production of] heavy water and the techniques for the enrichment of uranium were learned by the physicists following the application of a laser ray at certain frequencies at the radiochemistry laboratory of Unicamp. The information was confirmed by Paraiba Valley research circles, since the Aerospace Technical Center is contributing to the financing of the project which was created by the now deceased Professor Sergio Porto and the continuity of which is guaranteed today by his replacement at the Gleb Wattaghin Physics Institute of Unicamp, Professor Chiu Tsu Lin, the present leader of the laser team in that university.

Separation

Use of a laser ray for the separation of the deuterium isotope and the consequent production of heavy water were the subjects of research of the Rio physicist Sergio Porto for more than 5 years. The heavy water reactor can operate using the fuel (uranium) in its natural concentration of 0.7 percent. A heavy water nuclear reactor can also use thorium as fuel because it converts that raw material into fissionable Uranium-233.

According to the scientists, the heavy water is also important for the analysis of chemical reactions, especially those that require isotopic labeling for an understanding and explanation of mechanisms. The isotopic separation of uranium by laser is also being developed in the United States, the Soviet Union, Canada and Israel, with results that begin to show economic feasibility. For the enrichment of uranium by laser, the team of Sergio Porto and Chiu Tsu Lin discovered that it is sufficient to apply the emitting apparatus at a certain frequency.

Brazilian scientists have maintained contacts with foreign countries and have already reached the conclusion that the process developed in the laboratories of Campinas is very good. The Soviet physicists even consider it superior to that developed by them. As a matter of fact, before entering into the direct research of the effects of the laser ray, Professor Sergio Porto intensively studied photochemical and photophysical processes and molecular spectroscopy, in addition to laser technology. Today Unicamp is already preparing to produce a laser ray apparatus in this country which will enable the country to discontinue importing it. The whole technology of those monochromatic rays of intense light is now known by the scientists who work in the Unicamp Physics Institute team.

The system used by Unicamp for the production of heavy water is being kept secret and the scientists will not reveal which molecule is used to achieve the final product. However, it is already known that it is a compound we have in abundance in our country, which will permit the production of deuterium without the need for dependence abroad.

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BRIEFS

NUCLEP SEEKING MARKETS--NUCLEP, the state industry for equipment and components for nuclear plants, will begin to operate in Rio de Janeiro on 15 March. Created to take care of the Brazilian nuclear program, NUCLEP can also export to Latin American countries. One of the company's first export programs is already being negotiated with Argentina, which may place some orders with the Brazilian company instead of purchasing them in Europe or the United States. Brazil, in turn, may also import Argentine equipment, which will make possible a harmonious development of the nuclear industries of the two countries. According to the president of the Brazilian Nuclear Corporation (NUCLEBRAS), Paulo Nogueira Batista, NUCLEP will begin to operate with a large idle capacity because it will have few orders. But it is in a technical and financial position to gain new markets. The possibility of NUCLEP making up for the small volume of domestic orders with sales abroad is a relief to national industrialists in the machinery and equipment sector. They all feared that the new industry would compete in areas such as railroad or steel material to reduce its idle capacity rate. [Sao Paulo O ESTADO DE SAO PAULO in Portuguese 31 Jan 80 p 19]

FOURTH NUCLEAR PLANT--The fourth Brazilian nuclear plant will be built on the coast of Sao Paulo State, between Iguape and Peruibe, according to studies conducted by the Brazilian Power Companies Inc (ELETROBAS] and the Sao Paulo Power Plants [CESP]. The two enterprises have surveyed 10 areas (one in Belo Horizonte), and a Sao Paulo beach will be chosen for three main reasons: First, it is a sparsely populated region; second, it offers access for the unloading of equipment; and third, it is close to major consumption centers. ELETROBRAS has not yet officially announced its decision, among other reasons, because it has not yet decided who will build the plant--CESP or the Brazilian Nuclear Corporation. [Text] [PY061241 Sao Paulo O ESTADO DE SAO PAULO in Portuguese 5 Feb 80 p 1 PY]

CSO: 5100

COLOMBIA ENTERS THE URANIUM AGE

Plans for 1980's Outlined

Bogota EL SIGLO in Spanish 4 Jan 80 p 3

[Article by Maria Eugenia Martinez: "Colombia Enters the Uranium Decade"]

[Text] In 1980, Colombia will enter the uranium decade.

As Ernesto Villarreal Silva, director of the Nuclear Affairs Institute, told us, in the course of the next 10 years, it will be possible to begin mining uranium in areas already explored in the departments of Caldas, Huila and the Santanders.

"In 1982-83," claims Villarreal, "the first economically minable reserves, currently being explored by the Institute, along with the Colombian Uranium Company and two foreign groups, will be proven. Four years later, production could begin of enriched uranium, which is the commercial form of the mineral."

Uranium has become especially important to this country, so much so that in 1980, $10 million will be invested in the search for it.

We Know Little About Uranium

Unlike coal or oil, Colombia knows little about uranium, and started from an almost total lack of information about it. Thus the job of exploration began with a very general geological study of the mineral. The four groups that are doing the exploration have determined that there are areas of special interest in Caldas, Huila, Santander, North Santander and Cundinamarca, because of their uranium content. However, due to this lack of information, the work of exploration will continue for up to eight years.

Uranium is the raw material needed to generate nuclear energy, and Dr Villarreal sums up its characteristics as follows:

"Uranium is a mineral that can be used to generate heat, just as petroleum, coal or gas is used, but it is different from coal and the hydrocarbons in that it has no other uses. Uranium's sole use is the generation of energy in a process of nuclear fission. The resulting heat can be used, for example, to obtain the steam needed to run turbines for generating electric power. Over 99 percent of the present use of uranium world wide is for the generation of electricity."

"This mineral has a very high energy content," adds Villarreal,"which can be appreciated from the following example: A 1,000 megawatt coal-powered generating plant requires a little over 2 million tons of coal to operate for a year. The same plant, using uranium, would need only 30 tons a year."

Uranium, through a process of fission, is the basis of nuclear energy, which has tremendous implications in fields such as medicine, agriculture, and food preservation. In the military field, one of its most widely known uses is in the atomic bomb.

Who Searches for Uranium and How

Since its founding in 1959, the Nuclear Affairs Institute has been making an inventory of our possible uranium reserves. In 1967, it published a map classifying the various areas of the country according to their potential uranium content.

But it was not until after the energy crisis of 1973 that interest grew in this country in locating and mining this resource.

"In 1974," says Villarreal, "several European governments showed interest in prospecting for uranium in Colombia and it became urgent for the national government to define a way for the foreign companies to work with us. Finally, a policy was adopted that is similar to the one that governs our petroleum affairs. That is, it was suggested that we draw up partnership contracts which would spell out not only the conditions for exploration, but also for production, in case economically minable deposits should be found."

In 1976, after two years of negotiations, a partnership contract was signed with a French firm.

"We have been working under that contract for three years," says Villarreal Silva, "with rather interesting results. It appears that it will be possible to begin uranium production in Colombia in the course of the next 10 years."

In 1977, another partnership contract was signed with the Spanish firm of IMUSA and a third contract was signed with that same company in 1978.

"The Nuclear Affairs Institute," adds its director, "is working with the European companies exploring for the uranium. We are also carrying out exploration programs on our own and under the sponsorship of the United Nations and the International Atomic Energy Agency. We are doing a job that is parallel to that of the foreign groups, and the work is being done by the Colombian Uranium Company, S.A., which was recently created. Interesting results have also been obtained in three areas that we investigated and we hope that the deposits discovered by the group of organizations will begin to produce enriched uranium by 1987."

By Air and on Foot

The job of prospecting for uranium is neither simple nor cheap. Some $10 million will be spent in one year alone for the domestic and foreign groups to carry out their exploration programs.

When the uranium is located at great depths, it must be sought with conventional methods used with other minerals. If it lies near the surface, we take advantage of the fact that it is radioactive and continually emits radioactive particles that can be detected with special equipment.

"In Colombia," said Dr Villarreal, "uranium prospecting is being done by attempting to detect that radioactivity from the air, from vehicles or on foot."

According to the findings of the Colombian scientists, Caldas would be the first area to produce uranium, followed by Huila. These Colombians constitute 90 percent of the personnel team which, together with the Spaniards and the French, is prospecting for uranium.

Lack of Facilities, Personnel

Bogota EL SIGLO in Spanish 6 Jan 80 p 3

[Article by Maria Eugenia Martinez: "There are No Plans to Utilize Uranium in the '80's"]

[Text] In 1980, Colombia will enter the uranium decade and will invest some 400 million pesos in prospecting for this material, of which we have substantial deposits. Uranium is almost 30 times more efficient than coal, in equal amounts, for generating energy, and contracts have already been signed with Spanish and French firms for this purpose, as well as under the sponsorship of the UN and the International Atomic Energy Agency. The peaceful uses of uranium range from medicine and agriculture to food preservation. In an exclusive interview with Maria Eugenia Martinez, Ernesto Villarreal, director of the Nuclear Affairs Institute, explains the system used in exploring for and utilizing uranium, as well as Colombia's lack of plans to use it for the nation's progress.

Colombia has no definite plans regarding the way it will use the uranium for which it intends to prospect during the '80's. Ernesto Villarreal, director of the Nuclear Affairs Institute, asserts that this nation has sufficient time to make those plans, but says that the discovery of uranium in Colombia opens up several possibilities for the country.

Colombia could exchange it for nuclear technology, which is very difficult to obtain, or for oil, which will be scarce by 1990. It could use part of the mineral to generate electricity, which also will be critically short during this decade.

From the human point of view, the fact that this raw material may begin to be used to generate nuclear energy implies the creation of a whole new horizon for the new generations of scientists. At present, Colombia has only five nuclear engineers. One of them is Dr Villarreal Silva, director of IAN, who has announced an extensive plan to train exports in electro-nuclear subjects.

How Uranium is Produced

The production of uranium is a costly and complicated process and one that is particularly obscure and unknown to Colombians. Unlike coal, which is taken out of the mine to be burned, the uranium must be treated inside the mine and converted into enriched uranium in order to use it. That is what we plan to do before the end of this decade.

Dr Ernesto Villarreal, who received his engineering degree from the University of the Andes and Master's degrees in nuclear engineering from the Universities of Michigan and Pennsylvania, specializing in one of the various steps in the so-called "nuclear fuel cycle," explains how this mineral is produced.

"The first step is to treat the raw mineral in the mine to obtain enriched uranium, which is then transported to a plant and treated again to obtain a 100 percent pure concentration. It is a relatively simple process that could be performed in Colombia. Once the 100 percent pure uranium is obtained, it must be converted into a gas, a step which we could undertake in this country if we find large quantities of uranium.

The uranium gas then undergoes a process of enrichment in another highly specialized plant. This process consists of varying the isotopic composition of the natural uranium. As we all know, the elements of nature are composed of isotopes and uranium has two principal isotopes. Unfortunately, the one which is used to generate electricity is the more scarce of the two.

This enrichment process allows us to increase in natural uranium the proportion of the isotope that we are most interested in.

Subsequently, the enriched uranium gas is converted into solid form again and that form is the one used to manufacture the fuel elements that are transported to a nuclear reactor and used in a process of fission to generate heat.

After the fuel element, with the uranium in solid form, has been in the nuclear reactor for a period of time, it is taken out of the reactor. Then that fuel element is reprocessed to obtain the unspent uranium, along with a series of by-products formed while the fuel element was in the reactor. These by-products have medical or industrial uses.

This reprocessing of fuel elements gives off highly dangerous radioactive wastes which must be stored for a prudent length of time in order to avoid risks to the population."

The IAN and the National Uranium Company

There is only one agency in Colombia with the infrastructure necessary to support the work of prospecting for and producing uranium in Colombia: the Nuclear Affairs Institute, which is equipped with a nuclear reactor, a neutron generator and a source of industrial-type cobalt.

This agency has an annual budget of 150 million pesos and employs a total of 70 professionals, between specialists in the different branches of engineering, chemists, biologists and geologists. Its work included all matters relating to uranium until 1977, when the Colombian Uranium Company was created. Since that date, the IAN has been doing the preliminary exploration, making sure that these activities do not cause danger to the population and developing its infrastructure of laboratories and personnel in order to achieve uranium production. The Colombian Uranium Company, for its part, is in charge of the technical end of the exploration and of producing the uranium.

We Have No Nuclear Training Facilities

Despite Colombia's wealth of uranium, and the efforts to locate and mine it, the country has not yet opened the first school where personnel can be trained in uranium geology, radiation safety or mining and marketing uranium.

All the country's nuclear scientists working in this area have been trained abroad, but according to Dr Villarreal Silva: "The fact that the government is paying more attention to us now has allowed us to consider broadening the training of professionals. For the moment, we have sent 20 future uranium geology specialists to study on scholarship in various foreign universities. There is marked interest in these fie[illegible]dy among the new generations, especially engineering and nuclear [illegible]."

"The Colombian Uranium Company," says Villarreal, "is carrying out parallel programs to train people in various aspects of the industrialization and marketing of uranium in order to provide the country with the human infrastructure needed by our partnership agreements."

IAN Plans Expansion

Bogota EL SIGLO in Spanish 7 Jan 80 p 3

[Article by Maria Eugenia Martinez: "We Will Have Nuclear Energy in this Decade"]

[Text] It will be possible to use uranium to generate electricity in Colombia during the '90's, explained the director of the Nuclear Affairs Institute, Ernesto Villarreal. At the moment, this is a very long-range alternative, but the uses of nuclear energy derived from that mineral are already very diverse and it is being used in our country in the fields of medicine, water resources research, food preservation, the production of new species and the improvement of industrial production.

The Nuclear Affairs Institute, the national agency in charge of investigating and disseminating the applications of nuclear energy has begun the construction of its new building this year, as well as expanding its laboratories in order to support programs, especially medical ones, that are using this kind of energy.

Medicine, Industry and Safety

The IAN has not received continuous attention from the various government administrations. This is perhaps its best period, since, because of the worldwide and national interest in uranium, they are considering increasing its budget.

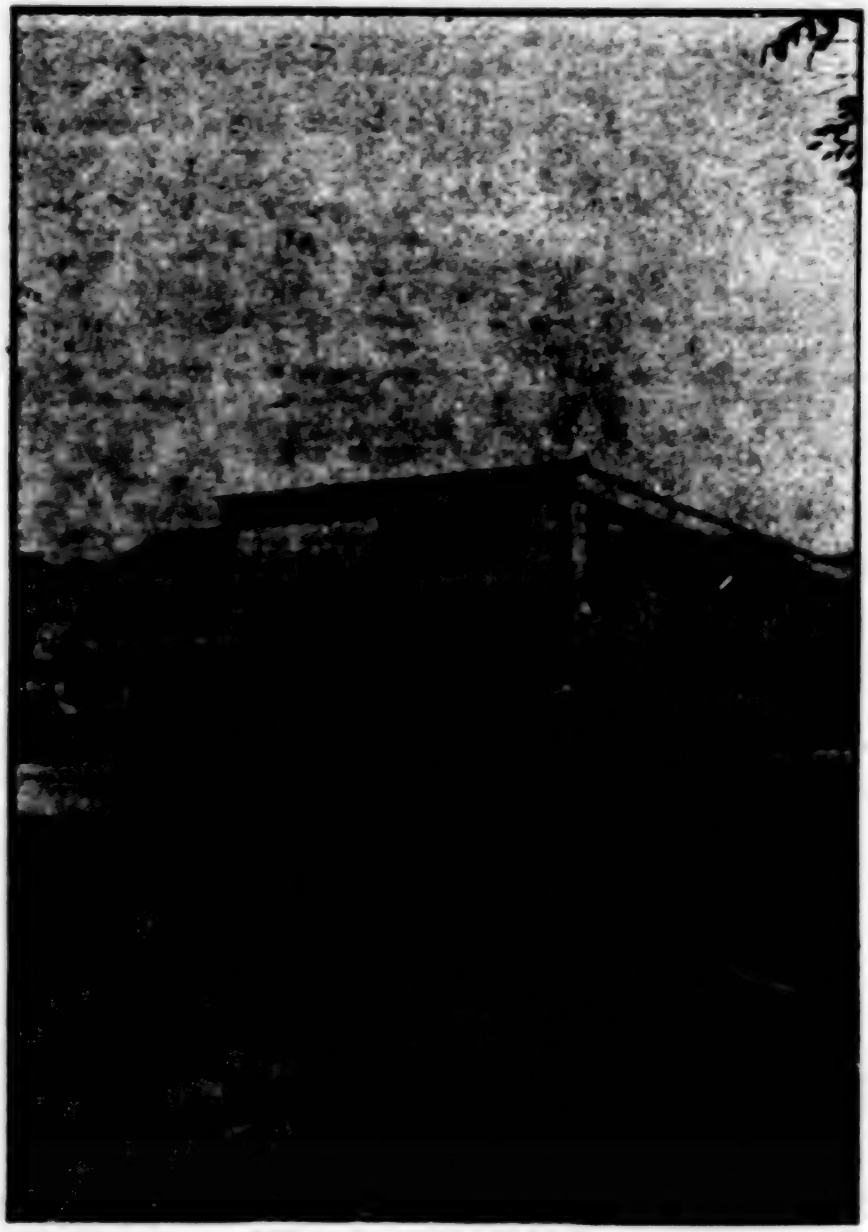
For some years, the agency has been advancing programs to adapt already developed technologies to our needs in the area of nuclear medicine.

Its director says: "We have been distributing to the entire medical body of the nation the radioactive isotopes necessary for the treatment of different illnesses. Most of these isotopes are imported by the Institute and diluted and prepared here. Also, we have begun to prepare some of these elements in our laboratories.

There will be nine more medical centers using equipment based on nuclear techniques, especially for the diagnosis and treatment of cancer.

"To supply the great demand for isotopic products which we will have," says Dr Villarreal, "the institute will build a new laboratory which will be completed in a year and a half. Thus we will be better able to support the most recent use of nuclear energy among Colombians--the medical centers that specialize in the fight against cancer.

The IAN offers two services to industry: dosimetry and gammagraphy. The first service determines the amount of radiation received by technicians operating equipment of this kind. The second is a kind of X-ray that is useful for determining the condition of industrial equipment.



The Nuclear Affairs Institute

"We also offer services for calibration of radioactive sources of cobalt," explains Villarreal Silva. We tell the user how to handle these sources so that they will not be dangerous. Lastly, we act as a regulative agency: we issue licenses to import radioactive material, and we can confiscate material of this kind that is being used without a license."

Preserving Potatoes

If this country were to acquire several sources of cobalt like the one the Nuclear Affairs Institute has, potato harvests could be stored and preserved intact for long periods of time. The IAN has already researched the dosage of radiation that should be applied to our tubers to prevent their decay. Another of the agency's research projects in the agricultural field was basedoon fertilizers, which were "tagged" with radioactive isotopes to determine the best times to apply fertilizers to cotton, potatoes and rice to avoid wasting these products.

Better Cattle

Within a year we will have the practical results of another study done by the IAN in cooperation with the ICA [Colombian Agricultural-Cattle Institute]. Using nuclear techniques, we are trying to determine the reason for the low fertility rate of cattle in the high altitude regions of the country. The research is being done on farms in the savannah of Bogota to improve cattle production, on which hundreds of families depend.

Another study being done by the IAN with nuclear techniques is soils research to determine our water resources.

The Energy of the Next Century

The nuclear energy that is being used in almost all human activities is still undergoing a process of maturation, because it is a new technique. "Nuclear reactors have existed for only about 30 years," asserts Dr Villarreal.

In the long run, says the scientist, the use of uranium could mean not only the solution to the energy problem, but a step toward new types of nuclear energy, such as nuclear fusion, for example. The best example of nuclear fusion is the sun, which uses nuclear energy to function."

"The hope of humanity is that during the course of the next century, we will have a nuclear fusion reactor that will consume water to generate energy on earth."

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BRIEFS

NUCLEAR ENERGY PROGRAM--Fausto Munoz, Ecuadorean Nuclear Energy Commission executive director, announced that Ecuador is already using nuclear energy in various fields of medicine, agriculture, industry and scientific investigation. In its report submitted to President Jaime Roldos, the Ecuadorean Nuclear Energy Commission says that it is implementing safety measures in the field of nuclear energy in health centers and that adequate measures have been taken to protect professionals and other persons working in this field. The Nuclear Energy Commission report says that radiotherapy programs have been carried out for the past 3 years in Quito, Guayaquil and Cuenca health centers and hospitals. It also has been standardizing equipment and giving technical aid in programming treatment for cancer patients. [Text] [Quito Voz de los Andes in Spanish 1230 GMT 27 Jan 80 PA]

CSO: 5100

'OBSERVER' SPECULATES ON RUSSIAN INVOLVEMENT IN ROESSING

Windhoek WINDHOEK OBSERVER in English 2 Feb 80 p 8

[Text]

Rio Tinto Zinc's Rössing Uranium mine in Swakopmund, is still a mystery to many South West African inhabitants, who because of the Atomic Energy Act, are bereft of information about the activities of this mine. A recent, and rather illuminating article in the London Sunday Times recently, states the following:

"Uranium from Rössing, Rio Tinto Zinc's controversial mine in Namibia, is secretly being sold to Japan, Iran and West Germany despite a UN ban. And a substantial part of those shipments are being processed into usable reactor-grade uranium by the Soviet Union. In the interests of secrecy, the trade is being run through a 'letterbox' company, set up by RTZ at Zug in Switzerland".

The article goes on to say that since Rössing, the world's largest open cast uranium mine, opened in 1976, RTZ has adamantly refused to reveal to whom and on what terms its uranium is being sold. Though RTZ is a British concern, the article continues, it chooses to shelter behind the South African Atomic Energy Act which bans the disclosure of any information about South Africa's nuclear energy programme. Although RTZ is the major shareholder in Rössing, South Africa's Industrial Development Corporation controls the largest single block of voting shares in it.

The export of minerals from Namibia is banned by a resolution of the United Nations which condemns South Africa's control of the country. The article continues:

"The only state publicly to admit having receiving shipments of uranium has been Britain. It is also known that France, through its state oil company, Total, has shares in Rössing and also receives and processes its uranium for its nuclear stations. Beyond that, nothing has been known. The West German and Japanese Governments have repeatedly denied any links with Rössing".

The writer of the article then says that their enquiries in South Africa, Japan, the United States, Holland and West Germany, have uncovered startling new facts.

"★Iran has a major stake in Rössing and is a major buyer of its uranium. This deal was done by the Shah; the Ayatollah Khomeini's regime is now trying to break the contract;

★Despite a Government announcement that all connection with Rössing had been severed some years ago, West Germany in fact remains a major investor and a major buyer from Rössing;

Despite equally vehement protestations to the contrary by the former Japanese Prime Minister, Japan also continues to receive Rössing uranium."

The article goes on to say that it is the processing of the uranium which gives rise to the most surprises. The uranium leaves Rössing as oxide. It has then to be turned into hexafluoride, then enriched and finally fabricated into rods, before it can be inserted into nuclear reactors. The logjam comes at the enrichment stage. Iran has no enrichment plant, West Germany no independent one. The only member of the nuclear club which has surplus enrichment capacity is the Soviet Union - it is a by product of their ambitious programme.

"In 1975-76 the Soviet Union did a deal with the Shah. The Soviet state company Techsnabexport enriches the Rössing uranium on behalf of Iran. The Soviet Union is also enriching Namibian uranium on behalf of West Germany - we estimate about half West Germany's current needs in fact. At an earlier stage in the processing, the British company, British Nuclear Fuels also handles Namibian uranium on behalf of Iran."

Although the South African Cabinet is not party to these deals, the article continues, it knows of, and indeed has to approve, all of them.

"The heart of this remarkable trade is a neat private house on a quiet street in the small Swiss town of Zug. The house, at 10 Baarenstrasse, is staffed by a single secretary. She refers all inquiries to a firm of Zurich lawyers, Pestalozzi and Gmür. Their speciality is the setting up of what the Swiss call 'letterbox companies' on behalf of the big multinationals. That Zug house is the nominal headquarters of RTZ Mineral Services, a Swiss company which Rio Tinto Zinc set up nine years ago. In reality RTZ Mineral Services operated from its parent company's London headquarters in St Jame's Square."

It must be remembered that RTZ handles half the world trade in uranium - and the bulk of RTZ's uranium now comes from Rössing. In 1973 Britain was the essential participant in Rössing, but with Britain committed, other customers joined the queue. Until now, the article adds, their identities have remained secret.

Iran's Rössing connection, they state, was part of the Shah's grand design to transform his country into a modern industrial power. A contract between Iran and Rössing was signed in 1975-6. The Iranians apparently turned down a South African Government suggestion that they do an uranium-for-oil deal.

Also according to the article, the uranium oxide (yellowcake) is flown from Windhoek to France. From there it is sent to British Nuclear Fuel's plant at Springfield Works near Preston for first stage conversion into uranium hexafluoride. It is then sent by rail across Europe for enrichment by the Soviet company Techsnabexport.

Russian involvement is surprising. The USSR provides military aid to Swapo, the Namibian liberation movement. It is a vociferous opponent of South Africa. It was hostile to the Shah. It subscribed to a UN resolution banning Namibian exports, but commercial considerations appear to have overridden political niceties.

After enrichment the uranium is transported by rail to one of West Germany's biggest industrial concerns, Kraftwerk Union.

EFFORTS MADE TO INCREASE ROESSING PRODUCTION

Biggest Blast Ever

Windhoek WINDHOEK OBSERVER in English 2 Feb 80 (Section 2) p 19

[Text]

WINDHOEK: According to an article in the weekly newspaper of Rössing Uranium, Rössing News, the mine had their biggest blast ever to give 1980 production a firm start. About two million tonnes of rock were blasted using 650 tonnes of explosives and 14,8 km cortex.

According to the article, this took a lot of combined effort. Production prepared for the drilling, they cleaned the face, for a free face to ensure a better break. Then the blasting section moved in and charged the holes with ammonium nitrate blasting agent. Certain holes are filled with water and are charged with a slurry. If a dry mix is used, in a wet hole, the explosive will dissolve. An average of 900 to 1000 kg of explosive is used per hole. At the completion of charging the holes, the balance of the holes are fixed with drill chippings. It took about a week to charge all the holes.

When the bench is charged, the holes are tied up in a set pattern for sequential firing. It is at this point that 14 800m of cortex was used and 40 milli-second relays are used between each line to achieve this sequential firing. The blast is then set off with a 2,4m safety fuse which gives the blaster 4½ to 5 minutes to make a hasty retreat.

Before the fuse is lit, all personnel in the pit have to be cleared 15 minutes beforehand. This is the most difficult time of the blast - they must check that everything and everyone is behind the flagged off areas. There are four bakkies with sirens that do this clearing.

The day of the blast the men were at the mine early to tie all the different holes. The fuses used were one for the small blast on the eastern side and one for the large blast on the western side.

In the past history of the mine, the article concluded, many records have been broken and they took the opportunity to congratulate the blasting section for breaking a record at Rössing.

New Crushing Target

Windhoek WINDHOEK OBSERVER in English 2 Feb 80 (Section 2) p 19

[Text]

WINDHOEK: The new target for this year is to crush 45 000 tonnes per day at the primary crusher. The primary crushers crush the ore from the open pit to minus 175 mm in size, a article in the weekly house magazine of Rössing Uranium, Rössing News, stated.

The best record last year was when they crshed 64 000 tonnes in one day.

CSO: 5100

BRIEFS

AWARD TO SCIENTIST--The USSR Supreme Soviet Presidium has awarded Oleg Igorevich Sumbayev, corresponding member of the USSR Academy of Sciences, the Order of the October Revolution. This is to mark his services to the development of nuclear physics, the training of scientific personnel and his 50th birthday. [Text] [Moscow Domestic Service in Russian 1900 GMT 3 Feb 80 LD]

CSO: 5100

FUTURE OF ZWENTENDORF NUCLEAR POWER STATION REMAINS UNDECIDED

Vienna DIE PRESSE in German 29 Jan 80 p 9

[Article: "Zwentendorf's Future Still Undecided; Substitute Power Station To Cost 7 Billion"]

> [Text] Vienna. With the future of the Zwentendorf nuclear power station still undecided, preparations are actively under way for the construction of a substitute facility. In an area measuring 120 hectares, owned by Donau Chemie and located 4.5 kilometers as the crow flies from the inactive nuclear power plant project, a steam power plant using coal and natural gas is being constructed by subsidiary Dampfkraftwerk Korneuburg GmbH. (DKG) and by Newag under one roof, but under separate management. This plant will generate 700 megawatts in its two parts. "For purposes of energy production, Zwentendorf does not constitute an alternative for us," said representatives of the two enterprises during a press conference, with reference to the atom ban law.

The disposition of the nuclear power plant will be decided around 1 March by the board of GKT (Gemeinschaftskraftwerk [Power Plant Consortium] Tullnerfeld GmbH). This corporation consists of the parent corporation and 7 out of 9 province corporations (Vienna and Burgenland are not participating). Their decision will be based on the report of a committee composed of two lawyers, two scientists and two business representatives. This committee was appointed in equal parts by the parent corporation and the provinces corporations. It is presently engaged in examining the alternatives "preservation," "changeover" and "cancellation" from the economic and technological points of view.

The least likely alternative to be approved--on account of the high costs, set at 2-5 billion schillings by first estimates prepared after the Zwentendorf plebiscite--would be a conversion to a conventional heating power station. Preservation or mothballing, advocated by the corporation's

director general Fremuth in view of a possible power shortage during the next few years, would cost about 40-60 million schillings per year, using about 50 employees. Cancellation and a sale of parts and equipment could yield several hundred million schillings, by using these materials in the substitute power plant for example.

At the present time, the location and details of the substitute power plants have been fixed: it is to be in Duernrohr. At a press conference, Newag president Poehnl and DKG director Moraw stated that the Duernrohr location was picked because cooling water could be drawn from the Danube; manpower would be available from Zwentendorf and a hookup with the power distribution net was available. In addition, they stated, there are plans for a Danube river port and the establishment of an industrial zone, both of which could utilize the plant's waste heat. There have already been firm discussions concerning heat pipeline service with the Tulln sugar factory which may build a Biosprit plant, and with Donau Chemie.

According to Newag and DKG, there will be no environmental adversities, since in case of a temperature inversion or absence of wind sulfur-free gas can be substituted for coal. The final decision for constructing the DKG part (380 megawatt capacity) is to be made in April or May, with energy production to begin in the fall of 1984. Newag's 320 megawatt part would be phased in 9 months later. Building costs for the two components amount to about 7 billion schillings. Based on the use of coal imported from Poland, Newag calculates electricity costs at .6 to .63 schillings per kilowatt hour, using 5,000 to 6,000 operating hours per year. The DKG calculates a slightly higher cost, using 4,500-5,000 operating hours. Net fuel costs amount to .28 schillings, compared with .5 schillings at the Korneuburg oil burning power plant.

9273
CSO: 5100

BONN OFFICIAL PROPOSES UNDERGROUND NUCLEAR POWER PLANTS

Hamburg DER SPIEGEL in German 28 Jan [illegible] p 47-49

[Article: "Noticeable Stomach Pains"]

[Text] In the future Bonn's Ministry of the Interior plans to shift atomic power plants underground. An outsider intends to break down the resistance of the electric companies.

For years Guenter Hartkopf, state secretary in Bonn's Ministry of the Interior, sought supporters for his favorite project. Then a disaster came to his aid. Hartkopf observes: "After Harrisburg, the time is ripe."

Encouraged by the disaster at the U.S. atomic pile, the Bonn official wants to settle on a new location--underground. Hartkopf believes that the radiating nuclear plants would be better there than on the banks of the Elbe and the Rhine.

The managers of German electric companies are, however, of a different opinion. Hartkopf has had a bad reputation with industrial types since last October when, at a nuclear conference in Muenster, he in turn pushed his idea and made threats ("I will resist any threat that our pursuit of safety will put out the lights").

The state secretary found out that the operators of power plants were "not at all happy" about his proposal. Maintenance of the underground pile is more complicated than for above-ground reactors. Besides, the nuclear bunkers require a multiplicity of new technologies. All of this expends time and involves new risks.

Finally, the managers of the electric industry realized what the costs would be. An underground reactor is about 20 percent more expensive than a conventional atomic pile. At a unit price of about DM 2.5 billion, in any event, DM 500 million would be buried in the earth.

Bonn's Hartkopf is little impressed by the stalling tactics: "The electric companies will digest the costs even if there are some noticeable stomach pains." According to calculations made by the nuclear managers themselves, energy from uranium is indeed one-third cheaper than energy from coal.

Hartkopf received support from experts from the nuclear research institute in Juelich. According to the Juelich experts, current from an underground reactor will at most be 8 percent more expensive than from a pile above ground.

About 25 testimonies and reports from experts, the final results of which will be available at the beginning of 1981, have already confirmed the secretary's judgment.

According to these studies, placing the reactor, the switching units and the emergency diesel power building in a pit 65 meters deep--with a 10-meter thick cover of earth--has important advantages.

The core of the reactor, where the greatest danger exists, would be better protected from external attack. Thus, a 10-meter thick covering of earth would protect against mortar shells up to a caliber of 120 mm. Additionally, the reactor would be better protected against air and artillery attacks.

Moreover, an underground atomic pile would better survive airplane crashes, and terrorists would not have it so easy.

Finally, the reactor would better protected from catastrophes like the one in Harrisburg. A portion of the deadly radioactivity released when the reactor core melts down would be filtered. The residue, according to the consolation proffered by the Hartkopf experts, will only poison the atmosphere after some delay.

To be sure, the dug-in pile also has a disadvantage: increased pollution of underground water. An expert from the Ministry of the Interior evaluates this risk soberly: "We have to breathe; we can drink."

Because underground construction has such advantages, Hartkopf does not want to lose any more time. According to the state secretary, the electric companies should at least begin immediately with the construction of an underground experimental station.

The industry is, however, fighting this and for a good reason. If these new power stations prove to be more secure, then heavy financial losses will be incurred.

Then, the purchasers of energy plants fear, they could be forced by court orders to build only the more expensive nuclear bunkers. Where possible, their above-ground reactors would have to be shut down unit after unit.

State secretary Hartkopf wants to take advantage of this fear of the energy operators. The Bonn official is trying to encourage the Swiss multinational concern Brown, Boveri & Cie (BBC), the only competitor in the FRG which the KWU, dependent on the reluctant electric companies has, to build the experimental station.

Up to this time BBC has been a rank outsider in the West German power plant business. If this company, however, builds the nuclear bunker and the test run comes off well, then the Swiss will suddenly be one up.

Then, of course, as Hartkopf entices, the BBC would have the competitive advantage, and KWU would be an also-ran. Above-ground atomic power plants would possibly no longer be approved.

For, without the safety factor, Hartkopf affirms, there would be "no green light."

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CSO: 5100

NUCLEAR FUEL REPROCESSING PLANT PLANNED FOR HESSE

Hamburg DER SPIEGEL in German 4 Feb 80 pp 109-110

[Article: "More Pioneering"]

[Text] Hesse will be the first federal Land to build a reprocessing plant for nuclear fuel rods. This vigorous nuclear policy of the coalition land is expected to "back up" Chancellor Schmidt in an election year.

In northern Hesse, the homeland of Minister President Hoelger Boerner, there are not many jobs for university graduates. "High-school students must emigrate right after graduation," complains the head of the SPD government.

This should change. If Boerner has his way, physicists, chemists and mathematicians will, in the future, find employment in northern Hesse. Somewhere between Waldeck and the Schwalm, on the Werra or on the Eder, a nuclear fuel reprocessing plant is going to be built--a complex such as the one originally planned for Gorleben in Lower Saxony, but not quite as large.

The plant shall separate uranium and the highly toxic radioactive plutonium (which forms in nuclear reactors as a by-product of nuclear fission) from used nuclear fuel rods, and reprocess them into new fuel material--a 3 billion project from which Boerner expects 1,500 "highly qualified jobs," and the federal energy industry a future freer from care.

What Boerner wants to realize in Hesse is exactly what Ernst Albrecht, head of Lower Saxony's Christian Democrats, rejected for Gorleben last year because it "had not been possible to convince large sections of the population that the plant was necessary and, technically and safety-wise, warranted." Concerning the political No of the people of Lower Saxony (Albrecht: "I do not want a civil war in this land") to an integrated waste disposal center in Gorleben, Heinz Herbert Karry, FDP minister of economy of Hesse, argues: "I cannot remember ever having met with such evidence of political incapacity."

The social-liberal coalition partners Karry and Boerner hold that the development of nuclear energy is imperative, even if it leads to intensified trials of strength between government and environmentalists, and even if it increases the latter's influence in the land.

Social Democrat Boerner feels reinforced in his nuclear policy by the course taken by the Berlin party congress, where he argued successfully against SPD chief ecologist and nuclear plant opponent Erhard Eppler: "I have fought for my point of view at the party congress; my point of view has won the majority, and now we are going to do what we have decided."

The minister president of Hesse fears that administration courts could force a halt of nuclear plants because of the uncertainty concerning waste disposal; this might enable the CDU/CSU to claim during the electoral campaign that the energy policy of Schmidt and Genscher is a failure. "Our fatty is protecting the chancellor's rear," says a Hessian party leader.

The weighty Hessian does not have to face elections for the next 2 years; the arguments of his minister of environment Willi Goerlach, member of the left-wing SPD group of ecologists, who considers that the project is dangerous because its technology has "not yet been tested on that scale," do not weigh much with Boerner.

Since the prices of heating oil and gasoline have been increasing, the prime minister also feels reinforced by public opinion polls in his advocating nuclear energy. The INFAS-Institute in Godesberg has recently determined that an increasing number of citizens consider that development of the nuclear industry is necessary.

While last year in April just about half the Hessians polled favored large-scale construction of nuclear plants in the country, 62 percent did so in December. The number of those against declined from one third to 24 percent According to Government Spokesman Edgar Thielemann: "The mood of the people has changed."

Minister Karry cannot imagine that "acts of violence such as those in Gorleben" could take place in Hesse: "That will not happen in Hesse." As for the reservations of the SPD left-wing--Boerner has never worried too much about the mood of the party.

First, the minister president did not even appear at a southern Hesse party congress which rebuked his nuclear policy. When the area South-Hesse decided to "get out of nuclear energy," Boerner, as the same congress, made a profession of faith in nuclear energy, stating that he would not "give up" its exploitation.

The Hessian minister president has been encouraged to build a reprocessing plant--against which prominent scientists had warned because hard-to-control fissile materials are released as soon as the fuel rods are broken into pieces--by a visit to Great Britain where a similar plant is being built

in Windscale. Says Boerner: "We must build one like that, so we won't have to store so much radioactive waste."

The Hessians, who want to build a plant with an annual throughput of 350 tons (Gorleben had been planned to treat 1,400 tons of nuclear wastes), base their decision on the fact that in the year 2000, roughly 50,000 megawatts of nuclear power will be produced in the FRG--approximately 5 times as much as today.

Since roughly 30 tons of spent fuel elements are discharged every year from a 1,000 megawatt reactor, according to the calculations of Karry's ministry, this would mean dumping close to 20,000 tons of radioactive waste between now and the end of the century. According to Karry: "We cannot leave such nuclear dumps to the next generation."

The Hessians are already administering the largest nuclear arsenal of the FRG: the largest nuclear power plant in the world is located in Biblis (2,500 megawatts), and the fuel element manufacturing plant "Alkem" located in Hanau stores the nuclear fission product plutonium by the ton. To the Hessians, the giant reprocessing plant is thus obviously a mere consolidation. Says Karry: "I must go on pioneering. I have been the first to advocate compact storage,"--a densely filled intermediate storage pending final storage of radioactive wastes.

According to Karry, the German Company for the Reprocessing of Nuclear Fuel Materials (DWK), acting as owner, will present an application for the construction of an atomic waste plant as early as March. Company site experts have been roaming the North Hessian countryside for weeks.

9294
CSO:5100

GENESTE INTERVIEWED, BACKS NEUTRON BOMB FOR FRANCE

Paris LE POINT in French 28 Jan 80 pp 34-35

[Interview with Col Marc Geneste, leading French authority on the N-bomb, by Dominique de Montvalon--date and place not given]

[Text] Should France acquire a powerful tactical atomic weapon in addition to its strategical nuclear force? Should she build the neutron bomb? Yvon Bourges has already pointed out that, on the technical plane, France could have at its disposal--"before 5 year's time"--its first operational neutron bombs.

A book, "War Held in Check" (which is going to be published by Copernicus Editions), lobs this capital debate onto the public square. Authored by the American atomic engineer, Samuel Cohen, 59 years old, the "father" of the American neutron bomb, and Col Marc Geneste, 59 years old, a graduate of Saint-Cyr, and a member for 15 years of the Atomic Energy Commission, this work is presented as a plea argued on behalf of the neutron bomb. By questioning Col Geneste, probably the leading French authority on the N bomb--who gives his own personal views here--LE POINT is opening a debate which will acquire importance in the years to come.

[Question] Yesterday, the subject of the neutron bomb was taboo in France. Today, the Army General Staff is beginning to discuss the matter. Why?

[Answer] I guess the evolution of the international situation is opening a lot of people's eyes. For the first time since 1945, the USSR has just sent its tanks from their files. People are, at last, starting again to take seriously, to remember its messianic pretensions. We are becoming aware, at the same time, that the strategic deterrent, on which our defense is almost exclusively based, can be "gotten around." To speak, indeed, as the president of the Republic rightly did on 31 December of "the danger of

war," is to really admit that war can break out and that our deterrent will thus have failed.

[Question] You are hostile to the deterrent?

[Answer] Certainly not! But deterrence is an objective, not a means. I am simply saying that to lock yourself into a blind alley on the defense of the country, nowadays, is madness. Strategic nuclear weapons and a powerful tactical nuclear weaponry are not opposed; rather they complement each other. Well, since 1945, the deterrence has above all been based on strategic terror. The bet has been made that an enemy would not dare to take up arms if he felt that he would set in motion, by so doing, an holocaust of which he himself, like the others, would be a victim. But if he does not think like we do, and if he attacks with his aeroterrestial forces--which, need I remind you, are in possession of solid tactical nuclear armament--what do we do? Do you think that we are going to stop him by blowing up the Kremlin? and they the Eiffel Tower? by massacring their civilians and above all our own? What we would need, in such a case, is the means to stop them dead on the terrain. I claim that we could henceforth be able to do it within several years. At the same time, we would shift the capital responsibility of starting or not starting an apocalypse onto the enemy, whereas today it is we who would bear this responsibility!

[Question] This does not correspond to the Gaullist notion of defense...

[Answer] Perhaps, but neither was it Hannibal's or Napoleon's! I am sorry that some Gaullists set up De Gaulle posthumously as a boundary marker. I am persuaded, in fact, that if De Gaulle were still alive, he would have evolved as he did formerly and we would already have the neutron bomb. If, at the start of 1960, he adopted the strategy of "massive retaliation"--which means nuclear terrorism--it was simply because France was the only country at the time which had no choice--if only because we did not have a sufficient quantity of fissionable material. Our strategy was dictated by our means. But one forgets that it was De Gaulle who, in 1965, decided to equip our land forces with a tactical atomic weapon: the Pluto missile. Do you think that it was to freeze this weapon in its simple role of trigger of a holocaust in which some people want to keep it?

[Question] Who is responsible for the freeze?

[Answer] The first piece of evidence: for a long period of time, we did not have the means to make another choice, especially because of a lack of enough fissionable material. But it is also true that, when massive material and intellectual investments have been launched in one direction, it is difficult--and painful--to rapidly change course. This dangerous time lag of doctrine on technique is not new. De Gaulle's pre-1940 ideas would have wound up by triumphing, but Hitler did not give them time to.!

[Question] You sincerely wish then that France will choose the N bomb?

[Answer] I will give you the figures which no technician will contradict. Our army has available today about 30 divisions. Well then! what I am saying is that only one of these divisions which simply has two neutron bombs, fired at the same time, would have a localized destructive capacity equal to the conventional firepower of over 50 divisions of the same type. I am at a loss therefore to understand this tactical defeatism which seems to paralyse us and which tends to confine our doctrine in nuclear terrorism of which we, ourselves, however, would be the first victims.

[Question] Nonetheless your N bomb frightens people.

[Answer] That is sheer madness. It is war that is immoral, not the means to nip it in the bud. To be sure, it is not a question of playing with the N bomb like a toy, but it is not serious to present it as an apocalyptic weapon. Roughly speaking, it is a question of a weapon which a simple howitzer, a missile or an airplane could fire and which, by its radiation, could neutralize in several minutes an aggressor--including tanks--for about 3 sq km round. But, above all, men protected by 1.5 meters of earth--the exclusive privilege of defenders--would suffer no harm. It is a real revolution, since, for the first time, the defender is at a decisive advantage at the expense of the assailant. Heretofore, on condition of paying the price, the attackers were always sure of winning out. Henceforth, it will be impossible to saturate the defense numerically. And when the defense is thus assured of winning, deterrence is assured and war is dead.

[Question] Your N bomb would be, for our time, the equivalent of Christopher Columbus egg!

[Answer] In a manner of speaking. But let us be serious! The choice is simple: either we make use of modern technology, or else--as in 1914-1918 or as the NATO strategy of the "measured response" has been proposing since 1960--we offer our chests as barrier to the enemy.

[Question] Does France know how to make the N bomb?

[Answer] Yvon Bourges has answered this question. I have nothing further to add.

9330
CSO: 5100

SOCIALIST PARTY WEIGHS NUCLEAR INDUSTRY POLICY OPTIONS

Option 1: Slow Growth

Paris L'UNITE in French No 360,30 Nov 79 - 6 Dec 79 pp 2, 16

[Text] This week we begin publication of a series of comments on the Socialist Project, as a contribution to the discussion which will continue until January within party sections. Only two parts of the text offer options between which the activists will have to choose. One of these choices concerns the energy policy.

In this article, Paul Quiles defends Option 1, opposing the massive development of nuclear energy.

Nuclear energy has twice brought about the fall of the government in Sweden. In Austria, a referendum on the construction of a nuclear plant nearly unseated the party in power. In the United States, the nuclear energy issue has been so central to political concerns in the past several years, that today President Carter's competence, popularity, and political power are being challenged over energy decisions. In the Federal Republic of Germany, the SPD is hesitating over whether to continue or end the nuclear program.

In France, on the other hand, no public debate has actually been held, even though more and more French citizens are justifiably anxious about the dangers that could be created by an accelerated nuclear program, or about the risk of armed conflicts which could be engendered by the oil crisis (Sofres poll on expansion, 21 September 1979). Recent events in the Middle East can only heighten these fears.

A debate on energy is therefore essential. But its technologic complexity, and the fact that passion often smothers reason, especially on the subject of nuclear power, make discussion difficult. Arguments are frequently limited to caricatures or simplistic positions. The Socialist Party cannot accept such a position. Its analysis and positions must be consistent with the tenets of socialism.

Party Principles

The party's position rests on five points:

1) We question once more the manner of capitalist growth, one of whose characteristics is indeed the unchecked consumption of energy. We know that the current rate of growth of Western economies, and an improvement, however slight, in the standard of living of the Third World, could create serious problems. As an illustration, we can point out that the developing nations, which represent three-quarters of the world's population, consume only one-third of the energy used on earth. Given their demographic evolution, their mere survival implies a ten-fold increase in their consumption during the next 50 years, and probably a twenty- or thirty-fold multiplication if these countries were to start, however timidly, to industrialize. We must therefore think about the ways and means which we can use to dissociate economic growth, which must be relatively high, from increased energy consumption.

2) We must endeavor to increase the country's energy independence.

Since 1973, energy has become an expensive product, and energy costs henceforth threaten the equilibrium of our trade balance, and consequently our national independence. All our efforts must be directed to lastingly reduce the importation of energy.

3) Respect for the environment is a self-imposed constraint on the part of the party; its members want to dominate nature without destroying it, in order to achieve, between man and his natural environment, a harmony that capitalist society has broken. It is widely known that an extensive energy consumption is least likely to be consistent with an active environmental protection policy, this being one more reason to avoid any uncontrolled growth in energy consumption.

4) The concept of financial profitability in the strict sense of the word is insufficient for the choice we have to make. The fact that the technologists and large groups who guide policy in energy matters do not concern themselves with the social cost of a decision, is not surprising. It is not in their interest to weigh the consequences of this policy on employment, on the environment, or on long-term effects. They are only concerned with immediate financial returns. But this cannot be the approach of the party, which must never overlook the social cost of decisions affecting not only the present but the future as well.

5) It is not acceptable that choice heavy with future consequences be made without democratic discussion. The formulation of the government's program for massive development of nuclear energy is characterized by just such a total absence of democratic involvement. No consultation took place, not even of Parliament, which was denied the right to discuss the

government's energy policy. Needless to say, the party holds a different view of the democratic debate that must be conducted before Parliament and the country.

Dangers

Two dangers must be avoided in the definition of a socialist energy policy.

The first is the acceptance of extensive but sometimes hasty analyses, which conclude that nuclear energy must be totally abandoned.

We must be realistic. We can always rewrite history and ask ourselves what France's energy position would be today if a different policy had been followed for the past 20 years in coal exploitation, in the diversification of supplies, in research, or in energy conservation. Unfortunately, this is not what happened, and we we come to power we will find ourselves heirs to an energy production and consumption structure which we did not create. This will have to serve as our starting-point. A certain number of nuclear plants will exist; the diversification of energy sources will be insufficient; the energy consumption per inhabitant will still be high; and the penetration of new sources of energy will be very low. Under these conditions it is impossible to think in terms of a stoppage of operating nuclear plants and a complete refusal to use nuclear power. How would we replace it? We cannot overlook the fact that in energy matters, decisions bear fruit only after several years (at least two years for energy conservation, seven years for nuclear power, and more than 10 years for new sources of energy.)

On the other hand, the second danger is to postulate, as the government is doing, that the only way to reduce our oil consumption is to develop nuclear power massively and rapidly. But this reasoning could eventually lead to an impasse comparable to the one in which we find ourselves today with the "all-oil" policy. We all know that 100 percent safety does not exist in industry, and in the industrial production of nuclear power we are confronted with the question of a large wager with a low probability of accident.

As the number of reactors increases (the government predicts that some 100 reactors will exist by the year 2000), this probability tends to increase. An excessively high and rapid growth in the nuclear power field will be reflected in increased risks:

Risks associated with material failures; rapid construction can lead to taking fewer precautions; increased costs can lead to savings at the expense of safety; the cracks found in the steam generators of the Framatome PWR plants are examples of such risks;

Risks associated with human failure (poor training or operator error). This seems to be one of the causes of the Harrisburg (USA) accident.

The stakes are thus considerable because a nuclear plant accident can have particularly serious consequences. The low risk probability, which nevertheless increases with the number of reactors and the hastiness of programs, does not prevent a serious accident anywhere in the world from causing movements for the rejection of nuclear power. We can even ask ourselves whether, under these circumstances, public pressure might not lead to an abrupt stoppage of construction programs and a shut-down of operating plants. And if nuclear power represents a significant portion of the energy balance, the national independence is paradoxically threatened, when the actual goal was to improve it.

All of which points to the need to minimize risks by reducing the development of nuclear power as much as possible.

This moderate increase in nuclear power will call for stronger safety measures and the adoption of democratic means of control over the totality of nuclear activities. As soon as it comes to power, the party is committed to organizing a major debate, approved by referendum, on the country's energy options.

In the meanwhile, party activists and elected officers must continue to oppose the government's energy policy, by striving for a reduction in the nuclear program, as well as for appropriate measures to encourage energy conservation and development of new energy sources.

The goal of the Socialist Project is to clarify our positions and to enlist socialist activists and sympathizers. Energy is certainly one of the clearest issues for these twin objectives. The debate now being pursued within the party on this difficult topic can only hasten the socialists' necessary awakening, away from the overly easy and dangerous path of preconceived ideas or of demagoguery.

Once the five tenets which must guide us are accepted, and provided that care is taken to avoid the two dangers cited above, there remains only one policy, aiming simultaneously to emphasize energy conservation, to show determination in promoting new sources of energy, and to slow down the encroachment of nuclear power.

Emphasizing Energy Conservation

There is no doubt that the measures advocated by the Left (such as the increase in manufactured goods consumption linked to the redistribution of income), will in the short-term entail a slight increase in energy requirements for certain sectors. But this will soon be compensated by structural measures designed to reduce specific energy consumption. An ambitious policy of conservation must be adopted, bearing on all sectors of consumption (industry, transportation, and domestic use), and backed by massive financial means. Various measures can be taken: adoption of consumption guidelines for appliances and dwellings, aid to investment,

fiscal incentives, taxes, placement of energy conservation specialists on enterprise staffs, and providing local communities with means of study and of financing for energy conservation.

All these measures are feasible and will rather rapidly provide considerable savings (15 percent less consumption than is anticipated by the government for 1990), without affecting the standard of living of the French people. On the contrary, they do not in any way represent a policy of austerity, as some would have us believe while being unable to prove it.

Vigorous Promotion of New Sources of Energy

Rather than re-state that these new sources of energy (solar, geothermal, biomass) are not adequate short-term oil substitutes -- which everyone knows -- it is better to seek to define a bold policy in this matter. Three main approaches should be considered:

Research, which is inadequate at present, must be intensified in order to perfect new technologies and to achieve cost reductions.

Financial incentives for installing equipment using new sources of energy (notably solar water heaters) must be greatly increased in order to develop a genuine market which does not yet exist.

Local community initiative must be encouraged; the new sources of energy are intrinsically decentralized and local communities can develop equipment fueled by these forms of energy, provided they are correctly informed and assisted. (1)

Such activities have an educational and pragmatic aspect which is particularly useful in the development of new sources of energy. We must be aware of the importance of decisions taken in this field in coming years. They will determine our future: depending on what is done between now and 1990, the 21st Century will be either the solar or the nuclear century.

While the government aims to devote 3 percent of the energy balance to new sources of energy in the year 2000, I think that 10 percent could be attained through a concerted policy. To those who might object that this rate of adaptation is too fast, I would point out that faster rates of developments have been seen in the past for new technologies (air-conditioned housing in the United States, over 21 percent per year from 1950 to 1970; black and white television in France, over 22 percent per year from 1954 to 1976).

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(1) To this end, the Association for the Development of New Sources of Energy (ADEN) has just been formed. President: Alain Bombard; Vice President: Philippe Marchand; Secretary: Paul Quiles. Address: 41 rue Bobillot, 75013 Paris.

Slowing Down Nuclear Encroachment

The measures considered above would make it possible to slow down the planned construction of nuclear plants (currently scheduled for five to six phases per year) to an average of one phase per year beginning in 1985; this would eliminate the need to develop breeder reactors, whose profitability has not been proven and which are a dangerous commitment for the future. This cutback would mean that reliance on nuclear power would be two-fold lower than is planned by the government for the year 2000.

Option 2: Rapid Growth

Paris L'UNITE in French No 364,4-10 Jan 80 pp 10-11

[Text] During the next few days, the Socialist Party's sections and federations will express their views on the Socialist Project which the National Convention will in turn examine and adopt on 12 and 13 January in Alfortville. To conclude the debate on the Project which has been conducted on these pages during the past several weeks, Francois Sorel now expresses his point of view, defending Option 2 on nuclear energy (Option 1 was defended by Paul Quiles in our issue No 360).

For one person out of three in the world, the problem of energy supply consists in finding wood to cook the next meal. (1)

When we talk of the energy crisis, we must therefore understand that the term is relative and that this crisis is not the same for everyone: for industrialized nations -- which harbor 25 percent of humanity and consume 85 percent of the world's energy -- the crisis takes the form of increased currency outflow since the sharp increase in oil prices in 1973. But for Third World countries, it is a constant factor which has always shaped social conditions.

If we want to be consistent in our wish to help Third World countries, we must face these realities. For example, what would happen if the industrialized countries -- reducing nuclear power to a marginal contribution -- were to continue using oil with the same greed as during the past decades? The result would be such a strain on supplies and such price increases that have-not countries -- where oil is an essential fuel -- would see their chances of economic growth virtually anihilated. We are living through the early stages of this unacceptable process, as was stated over two years ago by the Third World representatives to the World Energy Conference. (2) Did they speak in vain?

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(1) Lionel Taccoen points this out in his article "Bread or Gasoline?" in LE MONDE of 13 October. See also his book: "The Energy War Has Begun" (Flammarion).

(2) In Istambul, in September 1977.

France cannot ignore these facts, especially since 75 percent of its energy supply comes from foreign sources. This is a significant degree of weakness which leaves us, much more than most other industrialized countries, at the mercy of any economic or political crisis having sufficient effect on the international oil market. Such crises are far from unlikely to arise in the next decades.

This high level of unavoidable importations does not only lend uncertainty to the steadiness and reliability of our energy supplies, or to our trade balance; it also involves our national independence, in other words our country's freedom to choose its fate.

The socialists are in agreement about most of the answers to the economic question: we must conserve energy, and dissociate economic growth from energy consumption; promote our national resources; diversify our importations; and develop new sources of energy. However, discussion continues on one basic issue: the respective part of the various sources of energy in our total energy picture, and the scope to be given to our nuclear program.

This question is too important to be addressed without quoting some statistics.

In twenty years, France will probably have 65 to 70 million inhabitants. If a very concerted policy of conservation is adopted during this period, total energy consumption in our country in the year 2000 can be estimated at about 300 million Tons of Petroleum Equivalent (300 MTep). (3) This is not a prediction, but a mere and very optimistic hypothesis.

In 1978, French energy consumption was of the order of 180 MTep. To balance our energy budget for the year 2000, we will therefore have to find 300 - 180 = 120 MTep of additional energy resources.

How much of this supplement can be provided by our national resources?

An estimate -- still very optimistic -- can set supplementary contributions for the year 2000 at approximately 40 MTep from the three national resources of coal, hydraulic power, and new forms of energy (since our gas deposits will be approaching exhaustion by the 1980's).

But 120 additional MTep are still needed to attain balance on that date. Therefore, 120 - 40 = 80 additional MTep must still be found.

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(3) Tep is an energy measurement unit representing the amount of ene released by burning one ton of petroleum.

How? There are only two ways: to import fossil fuels, or to develop our nuclear program. The first solution would lead us to a level of dependence nearly equal to our present one. This seems unacceptable, as does the enormous financial cost which would result from such massive importations.

The second solution, for nuclear development, seems to offer several decisive advantages:

Reliability of supplies: our soil contains uranium reserves adequate to meet an essential part of our needs (3 to 5 percent of world reserves), and we own significant resources in several foreign countries (Canada, Gabon, Niger...)

Considerable currency savings: we need only remember that a 1000 nuclear MW installation can yield operational savings of 1.2 to 1.6 million tons of oil per year, or about 700 million francs in currency.

Beyond these two factors, we must consider our national independence. Do we or do we not want to reduce our level of energy dependence with respect to foreign countries? If we do, we must provide ourselves with the means to make this choice. In terms of our hypothesis, this level of dependence would drop from 75 to 50 percent with the adoption of 75,000 to 85,000 Tep of nuclear power. With half of our energy production guaranteed in this way by national resources, and provided that we simultaneously make efforts to better diversify our importations, we would be in an infinitely more stable situation than we are at present. This is the goal to be sought. And we still await proof that it can be reached without developing, in France, the appropriate nuclear program.

Option 2 does not mention anything about the scope and pace of this program. Option 1 plans 1000 nuclear-MW per year starting in 1985. This appears very inadequate on the whole, and in addition, it expresses a very rigid and technologically biased view of the problem.

What will the French energy situation be in 1985, for example? No one can say with accuracy. Rather than restrict the nuclear program to a rigid, predetermined framework, it would be more appropriate to assess the general magnitude of the needs to be met at given stages, and to adapt the pace and scope of the program to these circumstances and to those of the developing national and international situation.

This approach should logically lead us to take into account the exhaustion, within a few decades, of our national uranium resources, and to face the issue of breeder reactors, which constitutes one of the rifts in the current nuclear debate within the Socialist Party.

Without going into technical details, let us remember that this type of reactor utilizes uranium 50 to 60 times more efficiently than conventional nuclear plants. In order to get a clear perspective, we should point out

that if our national uranium resources were used in breeder reactors, they would represent an energy equivalent nearly equal to world oil reserves. This would mean, for France, a supply guarantee to be measured in centuries and not in decades.

Under these conditions, is it possible to label breeder reactors outright, as useless, as does Option 1, at a time when the world has entered -- and who knows for how long -- a dangerous area of energy turbulence?

This a priori attitude of rejecting breeder reactors, in our opinion, constitutes a risky gamble. On this point Option 2 seems more realistic, although still very timid. To our way of thinking, there should be no hesitation in incorporating breeder reactors into our energy strategy, because in the immediate future they may constitute a decisive factor in our independence. No doubt, conventional nuclear power is a guarantee of our energy supply; but this guarantee has a time limit. The breeder reactor system can prolong this guarantee and provide it with a more stable base.

Nuclear power entails its own specific risks, as do all energy production endeavors. Should the level of this risk cause us to re-examine the guideline we have just outlined? This is a crucial question where emotional attitudes still prevail too often over logical argument. Here are a few more figures: nuclear plants have been operating in the world for the last 30 years. There are currently more than 200 reactors in operation. This represents a total of more than 2000 reactor-years, without a single occurrence of nuclear accident in these plants to claim any victim among workers or populations.

This is a remarkable record which cannot be claimed by any other form of energy. In order to draw the necessary comparisons, it is enough to remember that since 1942, major mining catastrophes have claimed more than 4500 lives, and dam failures have caused nearly 10,000 deaths since 1959.

Absolute safety is not of this world, and all human activity entails a share of risk. In the case of nuclear power, the risk appears to be fairly well under control, both with respect to plants and wastes. However, no one would make the claim that a serious nuclear accident can be forever ruled out. But the probability of its occurrence is so low that this hypothetical risk cannot, in our view, outweigh the directly measurable benefit we can derive from the use of this form of energy.

"But what will our grandchildren say about our legacy of plants and waste?" This question may be asked by some of our readers. Shouldn't we reverse the question, and ask ourselves: "What will they say if we turn out to be incapable of providing them with an acceptable future in terms of economy and energy, due to our failure to anticipate and implement the necessary actions when it was still time?"

Assessment of Options

Paris L'UNITE in French 21 Dec 79 p 4

[Text] Neither of the two energy options proposed by the Project satisfies us entirely.

We feel that the flaw of Option 1 is that it is based on projected figures for a nuclear program which lies in the future. Our first objection is that at the same time, the project justifiably refuses to engage in this type of precision. Another concern is that uncertainties concerning energy are such, that we find it unrealistic to rely firmly on figures. For instance, if the first option's underlying, very concerted energy conservation hypotheses did not come to pass, how meaningful would a commitment be, not to build more than 1000 nuclear-MW per year?

We find Option 2 equally imprudent, because it appears to be overly confident in nuclear power. It defends a program where 20 percent of our total energy in 1985 would be provided by nuclear power, but we tend to foresee that by 1990, under this program, 70 percent of the electric power produced would be furnished by nuclear energy; we find this excessive for a form of energy whose technical and financial worth has not yet been sufficiently proven.

We are saying, first of all, that a maximum of energy has to be conserved while not placing firm expectations on the results; this effort will bear particularly on transportation and industry, but also on home consumption, thanks to insulation and improved appliance efficiency. This policy should make it possible to dissociate increases in energy consumption from economic growth, which must remain steady enough to allow us to succeed in our social objectives and in the struggle against unemployment.

We are also saying that in short- and intermediate-terms (199) it is possible to import more fossil fuels, if choices are wisely made among those countries which are likely to sell us gas or coal, and which will be able to purchase our equipment in exchange.

Finally, we are saying that research efforts must be renewed now so that new sources of energy can reach the market as soon as possible and on a large scale. We believe in solar energy, in geothermal energy, and in biomass. Provided that the right means are applied immediately, these technologies can assume a large role in our energy picture 15 or 20 years hence.

Therefore, much better results can be expected than those proposed by the authorities in all these fields: this is what we mean by a policy of diversification, which we propose against the all-nuclear policy.

For us, nuclear power is only a stop-gap for the energy balance. If other elements of this picture meet our expectations, nuclear power will be greatly reduced, which means that planned phases can be spread out over longer periods of time. If we were to meet with major disappointments in the matter of solar energy or energy conservation, the nuclear program would then have to be speeded up somewhat, without thereby attaining the pace proposed by our present leaders.

As for breeder reactors, by the same logic, we think that our bridges should not be burned, and that research must continue (in this and other areas) while energetically refusing to commit ourselves to industrial exploitation of these reactors before knowing the results of solar energy research, in other words around 1990.

The flexibility which we recommend is an answer to the exigencies of an industry which is reluctant to face the unexpected, both in terms of investment and of the manpower used. Finally, our suggestions take into account the dangers of energy rationing which could result from both Options 1 and 2: in the first case, if energy conservation did not take place as anticipated, and in the other case, if rushing the nuclear program led to more or less prolonged technical shut-downs at power plants, as is happening now. The true diversification which we are proposing is therefore the only kind which can assure us of success in reaching our social objectives (particularly concerning unemployment), and consequently guarantee our credibility in the eyes of the workers.

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BREEDER REACTORS AND NONPROLIFERATION

Paris CEA NOTES D'INFORMATION in English Nov 79 pp 2-13

[Article by M. Rapin and J.-Y. Barre]

[Text]

The energy potential of nuclear breeder reactors is well-known from the beginning of the studies on nuclear fission, more than 30 years ago. It is a fact that one tonne of natural uranium contains about 7 kg of 235 uranium, used for the energy production in thermal neutrons reactors, and 993 kg of 238 uranium. This fact implies that a global use of the energy available in uranium goes necessarily through the 238 uranium utilization : nuclear breeders plants allow the most efficient utilization of that 238 uranium. The call for breeding, only possible practically through fast neutrons reactors, has always appeared, for all the countries involved in nuclear energy, the logical and necessary continuation of thermal neutron reactor systems, taking into account the limited uranium ressources : the first nuclear reactor in the world that produced electricity was the fast breeder reactor EBR I on December 1951, in the USA.

If this comprehensive policy, based on the call for fast breeder reactors, continues to be followed in the industrial countries, the largest energy consumers, the nuclear energy would really bring to the world energy problem the solution for several centuries : there would be no more difficulty on the world uranium ressources.

But, since more than two years, on the basis of new orientations of the non-proliferation policy, the sharpest critics are adressed, specially in the USA, to fast breeders reactors, and to the reprocessing industry that necessarily go with them.

What is the weight of the arguments presented, in some countries, to reject such breeder reactors, and the reprocessing, on the basis of the increased proliferation risks they will introduce ?

Plutonium is an unavoidable by-product of thermal neutrons reactors operation, especially of PWRs operation, reactor system admittedly acceptable to-day by the large majority of governments and public opinions. The use of plutonium in breeders plants is the only way, presently demonstrated, which permits to multiply by more than 70 times the energy potential of the available uranium compared to its use in thermal reactors. Taking into account the solutions chosen for the development of the uranium-plutonium cycle and the measures that can be adopted in the short term, does the fact to use plutonium in breeders plants increase the proliferation risks compared to a solution where that plutonium will simply be stored as a waste ?

Notions and possible scenarios of proliferation

A very clear distinction must be done, at the beginning, between on one hand, the non-proliferation problem which concerns the measures needed to prevent the use, by a government, of fissile materials, nuclear technology or technical devices for nuclear military applications, and, on the other hand, the notion of prevention against any diversion by individuals or terrorists groups. Both these problems differ basically, although they are very often mixed in the public opinion and addressed by the same term « proliferation » by some governments. The goals of a government deciding to enter diversion for the realization of a military nuclear programme, and the means he will devote to reach such goals, have nothing common, and represent another order of magnitude, with the goals and the means of a subnational group.

In the same way, the aim of safeguards, also called international controls, which is to prevent and to detect possible diversions by governments, must be clearly separated from physical protection measures and from national controls which aim to prevent and to detect sensitive material thefts or unauthorized removals by individuals or terrorists groups. Would, on some aspects, the techniques used in both cases have partial common bases, the specific aspect of safeguards, carried on by the IAEA, is evident in its principle and in its application.

An assessment of the proliferation resistance, i.e. of the greater or lesser easiness a given cycle can offer to a government to divert fissile materials, only based on the quantity of fissile materials present in that cycle, would only deal with a very small part of the problem. This limited approach is unfortunately of common practice to-day. A correct assessment of a non-proliferation policy must also include not only the nature and the level of the technical, political and financial means a government can devote to the development of a military programme, but mainly the whole possible proliferation strategies, including the nature of the risks and of the political drawbacks associated with any strategy. To develop such a programme, a government can follow either the path of the diversion of fissile materials, nuclear technology or technical devices from a civil nuclear programme or the path of the build-up of specific nuclear facilities totally disconnected from any civil programme, what seems to be the most likely solution.

The bases of any non-proliferation policy are the political commitments by a government not to use nuclear materials and technologies, imported or not, to fabricate nuclear military devices. These commitments imply the implementation of safeguards aiming at detecting in the shortest time any breach of such commitments.

Any situation where such political commitments or such safeguards don't exist, represents evidently for a government a largely more economical, faster and less risky path to reach nuclear military devices than the path going through the facilities of a safeguarded civil nuclear programme.

Then, any assessment of the proliferation risks of a given fuel cycle must study which phases of that cycle offer to a government, having decided to breach its international non-proliferation commitments, the largest contribution to a military programme with the lowest political risks and drawbacks.

Finally, as a non-proliferation policy must be global, i.e. it must not be focused on a given fuel cycle or on a phase of that cycle — as it was recently the case, in some countries, for the plutonium cycle or the reprocessing —, so an assessment of the proliferation risks can only be done relatively to the risks coming from the reference fuel cycles largely accepted to-day, as the light water reactors uranium cycle.

The goal of the solutions presently used to implement fast breeders and their fuel cycle is not to obtain a zero proliferation risk for the plutonium economy, but to make that this plutonium use don't present more proliferation risks than those coming from the development already performed and commonly accepted of light water with their fuel cycle.

« uranium » and « uranium-plutonium » fuel cycle

« Uranium » cycle or « open » cycle

The cycle, called « uranium » cycle, often used as a reference by the opponents to reprocessing and fast breeders, is not a cycle but a « one-through » (fig. 1). The energy potential of the nuclear materials present in the spent fuel subassemblies is no valorized : these materials as 235 uranium, 238 uranium and plutonium are not recycled for the energy production, but stored subassemblies with all the environmental and proliferation problems this solution can create.

This uranium cycle start at the mine and includes the following phases : conversion, isotopic enrichment, phase specially sensitive for proliferation according to the separation technique used, then fuel subassemblies fabrication, reactor irradiation, phase during which the plutonium is produced, and finally storage of spent fuel subassemblies contuining the fission products, the 235 uranium, the 238 uranium and the plutonium. To produce 1 GWe during one year, at a 70 % capacity factor, a pressurized light water reactor needs about 150 tonnes of natural uranium and 120 000 SWU to enrich at about 3 %, with 0,2 % enrichment tails, the 33 tonnes of uranium that represent the annual fuel reload. The spent fuel subassemblies annualy discharged represent about 32 tonnes of uranium enriched at about 0,8 %, i.e. 250 kg of 235 uranium and 250 kg of plutonium : this cycle considers these products as wastes !

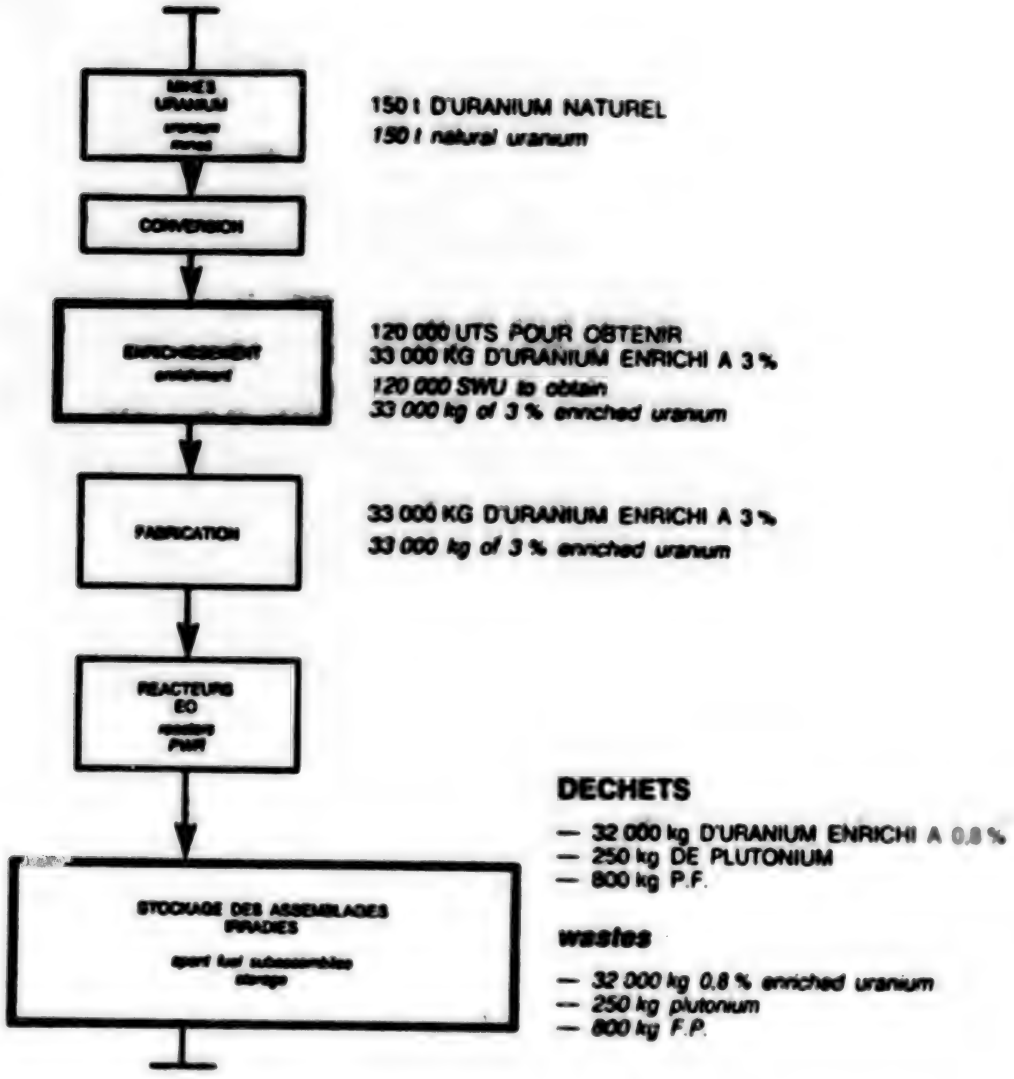
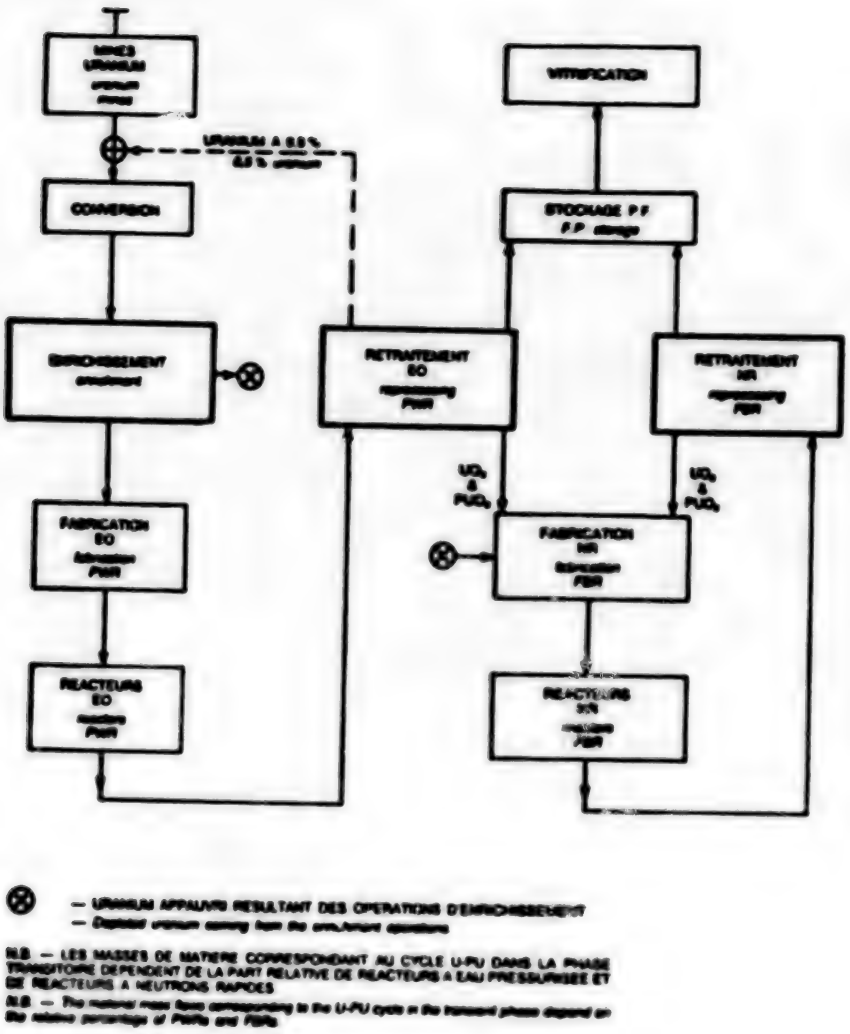


Fig. 1. — Uranium cycle without reprocessing. Annual discharge and reloading for 1 GWe capacity factor : 70 %.

Then, the « uranium » cycle presents two sensitive points on one hand the enrichment facility, on the other hand the plutonium present in the spent fuel subassemblies storage. For that plutonium, this « open » cycle don't show, evidently, any durable solution.

At the levels of the enrichment and of the fuel fabrication, the uranium is maintained at an isotopic composition largely lower than the values used for military applications. However, at a 3 % enrichment, two-thirds of the separative work needed to reach a



N.B. — LES MASSES DE MATIERE CORRESPONDANT AU CYCLE U-PU DANS LA PHASE TRANSITOIRE DEPENDENT DE LA PART RELATIVE DE REACTEURS A EAU PRESSURISEE ET DE REACTEURS A NEUTRONS RAPIDES

Fig. 2. — Uranium-plutonium cycle. Transient phase.

military enrichment, starting from the natural uranium, have already been carried out. Due to the development, in some countries, of new isotopic enrichment techniques particularly sensitive, as the centrifugation or the laser technique, a very specific attention must be paid to that type of facilities. The separation techniques the least sensitive for proliferation, as the gaseous diffusion technique or, especially, the chemical enrichment technique, would have to be recommended by the responsible peoples who have a real care to minimize the proliferation risks associated to civil nuclear programmes.

The plutonium, unavoidably present in the spent fuel subassemblies, is protected, during a limited time by the activity of the fission products mixed to the uranium and the plutonium : to extract this plutonium, a reprocessing plant is needed. But this activity decreases very quickly, that makes rapidly enough accessible, through a chemical separation operation, the plutonium present in the stored spent fuel subassemblies. Then, this storage presents significant risks which increase with time, the spent fuel subassemblies stocks finally constituting genuine plutonium mines relatively easy to work. These plutonium mines will furthermore be spread in many places : the management of the wastes which, in this uranium cycle, are the spent fuel subassemblies themselves, with the uranium, the plutonium, the fission products and the higher actinides included, is evidently committed to the waste producers care.

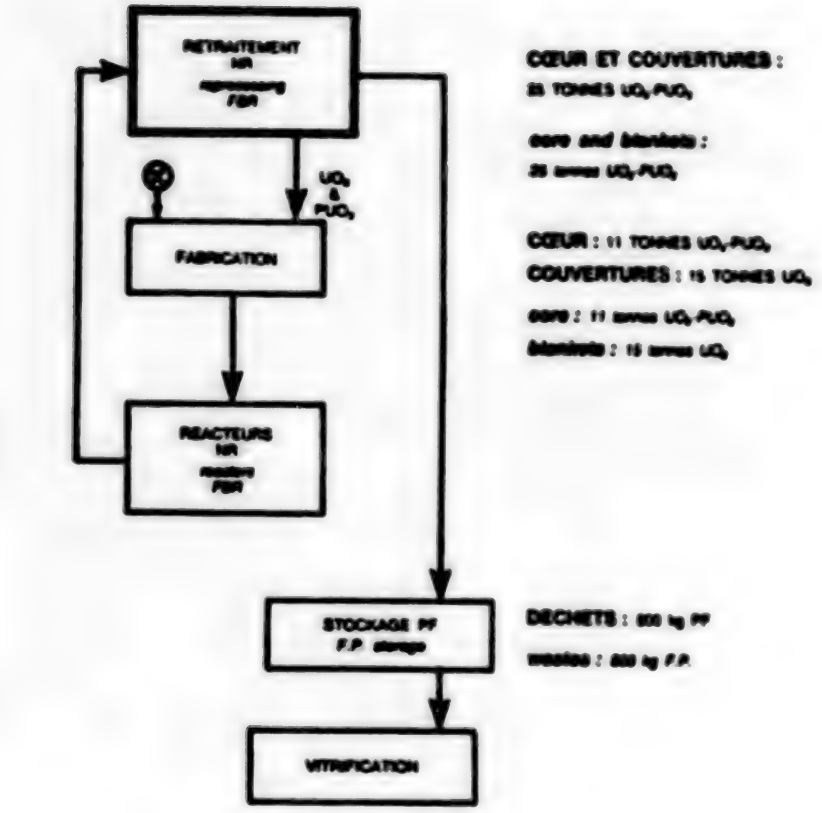
« Uranium-plutonium » cycle

The start-up of a fast breeder reactor system implies a transient phase, during which the plutonium coming from thermal reactors feeds fast breeder, then a equilibrium phase where the breeders become selsufficient.

The uranium-plutonium cycle then includes, in the transient phase, the same stages than those of the uranium cycle, excluding the spent fuel subassemblies storage (fig. 2). Instead of being stored, the light water reactor spent fuel subassemblies are reprocessed to isolate, on one side, the fission products and, on the other side, the uranium and the plutonium. The uranium is recycled either at the enrichment stage, or, together with the plutonium at the breeder fuel subassembly fabrication stage.

In an equilibrium phase for fast breeders plants, the depleted uranium coming from the enrichment tails, or the natural uranium, and the plutonium enter the fabrication plant of the fuel subassemblies. These ones, after irradiation in the reactor, are normally reprocessed (fig. 3). The extracted uranium and plutonium are recycled at the beginning of the cycle. The fission products and the higher actinides only are considered as wastes.

In an equilibrium situation, the annual fuel reloading per GWe corresponds approximatively to 11 tonnes of mixed oxide uranium-plutonium containing about 16 % of plutonium oxide for the core and 15 tonnes of depleted



— URANIUM APPAUVRI RESULTANT DES OPERATIONS D'ENRICHISSEMENT OU EVENTUELLEMENT APPORT D'URANIUM NATUREL

— CONSOMMATION D'URANIUM NATUREL : 1,4 TONNE PAR AN

Fig. 3. — Uranium-plutonium cycle. Equilibrium phase. Annual discharge and reload for 1 GWe, capacity factor 70 %, average burn-up : 50 000 MW d/t.

uranium oxide for the axial and radial blankets (7 and 8 tonnes respectively).

At the stage of the discharge and of the reprocessing, the material mass flows are of the same order of magnitude, i.e. 25 tonnes of mixed oxide uranium and plutonium for the core and the blankets globally, for a 1 GWe plant operating at a 70 % capacity factor. Due to the remarkable property of breeding, a Pu yearly excess of 200 kg, compared to the material mass entered at the beginning of the cycle, is made available to feed new breeder plants.

Assessment of the present « uranium-plutonium » cycle

Description

The uranium-plutonium cycle presently implemented for fast breeder reactors corresponds to the following reference solutions :

a) spent fuel subassemblies reprocessing with separation of the uranium and the plutonium and separated conversion in UO_2 and PuO_2 ;
b) temporary storage, at the end of the reprocessing sequence, of the UO_2 and of the PuO_2 ;
c) transportation of the UO_2 and of the PuO_2 to the fuel subassemblies fabrication plant ;
d) temporary storage at the fabrication plant ;
e) blending of the mixed oxide UO_2-PuO_2 and fuel subassemblies fabrication ;
f) temporary storage of the fresh subassemblies at the fabrication plant ;
g) transportation of the fuel subassemblies to the reactor plant ;
h) storage of the subassemblies at the reactor plant before loading ;
i) power production at the plant ;
j) storage, at the reactor plant, of the spent fuel subassemblies for cooling ;
k) transportation of the spent fuel subassemblies to the reprocessing plant ;
l) temporary storage at the reprocessing plant, then back to « a ».

At the equilibrium, the reprocessing plant which feeds the U-Pu cycle can be [illegible]ored to the enrichment plant which feeds the urani[illegible]cle.

Conclusions

During the transient phase, the uranium-plutonium cycle, where the light water reactor spent fuel subassemblies are reprocessed, allows to eliminate one particularly sensitive point of the uranium cycle, the storage of the spent fuel subassemblies containing important plutonium quantities, easily accessible after some years for cooling.

At the equilibrium of the U-Pu cycle, during at least two-thirds of the global fuel cycle time, the plutonium

oxide is protected against any diversion by a very strong radioactive barrier of fission products, from the beginning of the irradiation in the reactor plant up to the last phases of the reprocessing process. Then, the sensitive points of the present uranium-plutonium cycle are limited to :

— the temporary storage of the separated plutonium oxide at the end of the reprocessing process.
— the temporary storage of the separated plutonium oxide at the beginning of the fabrication process.

For the remaining parts of the cycle, once in the form of mixed oxide or fuel subassemblies fabricated, the plutonium, used as fuel, presents no more proliferation risks than the plutonium, considered as a waste, present in the light water reactors fuel subassemblies stored after cooling. In fact, this former plutonium presents even less risks, due to the geographical concentration of this product in fast breeder fuel cycle facilities, concentration that facilitates safeguards.

Taking into account the optimal capacities for the industrial fabrication and reprocessing facilities of the U-Pu cycle, safeguards, based essentially in the uranium cycle on accountancy and inspection, must use more largely the existing techniques of confinement and surveillance complementary to accountancy techniques.

Contrary to the uranium cycle where safeguarding the storages of spent fuel subassemblies, containing plutonium more and more accessible with time, must be ensured for ever, the uranium-plutonium cycle allows to control the plutonium balance : fast breeders plants can really easily be transformed in excellent fast plutonium burners by replacing blankets by reflectors.

In both uranium and uranium-plutonium cycle, a first path for a country willing to go nuclear, would be to build, before breaching its non proliferation commitments, a rough reprocessing facility, what can be done out of any international control. The diversion of cooled spent fuel subassemblies stored in the uranium cycle or of fresh fuel subassemblies at the fast breeder fabrication plant then gives access to sensitive materials. A direct diversion of plutonium oxide from the out-put storage of the reprocessing plant or from the in-put storage of the fabrication plant seems to be a particularly risky path for a government, taking into account the importance of the safeguards applied to such delicate parts of the cycle.

In the uranium cycle, a second path for a country would be to re-enrich from 3 % up to more than 90 % the

uranium used for the fabrication of the light water reactor fresh fuel subassemblies. Before breaching its commitments, a rough enrichment plant would have to be build , what can be done also out of any international control. The new separation techniques presently developped in some countries, as the centrifugation technique, lend themselves more easily to such a type of copy than the gaseous diffusion technique. The ideal solution, on the non-proliferation point-of-view, would evidently be the separation technique which physically cannot provide for the enrichment levels implies extremely long times to reach these enrichments.

All these previous remarks show that, globally, taking into account the international controls applied, the uranium-plutonium cycle in its present industrial implemenation for fast breeders plants, presents no more proliferation risks than the reference uranium cycle.

Possible modifications of the present uranium-plutonium cycle

The various suggested modifications enter into three categories : technical measures, structural measures and institutional measures. Some of these suggestions, indeed, are not specific of fast breeders. Some proposals are by too far so unrealistic or « futuristic » that they cannot receive the general consensus necessary for any measure, always constraining, aiming at decreasing proliferation risks.

Technical measures

Three types of barriers have been proposed to make more difficult the diversion and the use for the plutonium oxide for military applications : an isotopic barrier, a radioactive barrier and a chemical barrier.

The suggested creation of an isotopic barrier by mixing 238 Pu with plutonium does not seem realistic for both main reasons :

a) the production of the needed 238 Pu quantities appears extremely difficult ;

b) in the breeder cycle, whatever the 238 Pu isotopic content in the plutonium is, the equilibrium isotopic composition will be lower than 1 %, i.e. a value lower than that of the plutonium coming from light water reactor fuel reprocessing.

Various solutions have been suggested to introduce a radioactive barrier *in the PuO_2 oxide : partial decontamination at the reprocessing plant, preirradiation, spiking. The proposed reprocessing technique, called CIVEX, plants to include such a barrier. The main drawback of that type of solutions is to strongly increase the difficulties of the civil industrial nuclear applications, by increasing the workers exposure risks. Such solutions would furthermore impose deep modifications of present reprocessing and fabrication plants, with all the corresponding intricacies and overcosts. Finally, such a radioactive barrier will significantly decrease the efficiency and the accuracy of the non-destructive techniques presently used for safeguards and national controls.*

A blending of the uranium oxide and plutonium oxide powders at the output of the reprocessing plant, before delivery, introduces a « chemical barrier » against diversion of separated PuO_2. It seems possible to implement that solution without major modifications of the present reprocessing and fabrication plants and without too large overcosts. The proposals of direct co-conversion of the uranium and plutonium nitrate solutions, at the end of the reprocessing process, for example by co-precipitation or co-denitration, appear to be longer-term solutions and give no real advantages compared to the blending solution. The spent fuel co-reprocessing technique which would avoid any separation of uranium and plutonium, implies significant modifications of the today process and still asks for important R & D studies.

The advantages of all these suggested technical measures concern more the prevention against diversions by individuals and terrorists groups than the non-proliferation aspects. It must be clear that there exists no technical measure which can, alone, eliminate completely any proliferation risk of a fuel cycle : there is no technical-fix.

Structural measures

The localisation on the same site of reprocessing and fabrication plants eliminates some transportations : then it

is mainly a solution orientated towards terrorism prevention. It can, however, make easier the international controls, by the concentration realized on the same site. The localisation on a same site of the reactor plants and of the reprocessing and fabrication plants is more complex. Its only interest is also to limitate the transportations. But the possibilities for implementing such a solution are really specific of each case : site conditions, local energy consumption, optimal capacities of the reprocessing and fabrication plants. For non-proliferation, the advantage of these solutions remains small.

The improvement or the « tightness » of fabrication and reprocessing plants presents several advantages for the reduction of personnel radiation exposure, for the terrorism prevention and for the proliferation prevention. The today plant designs which already necessarily include a significant confinement, could be improved gradually. The basic idea is to extend the existing confinement to the whole plant, in order to surround the facilities by a « tight » barrier and to minimize the in-puts and out-puts, then to facilitate safeguards. In that solution, the main emphasis is placed more on the physical deterrent against undetected diversion, than on material accountancy, the accuracy of the latter technique being necessarily limited in large industrial plants. This type of « pipe » plant concept, called PIPEX for the reprocessing facility, has already been introduced by France at INFCE.

Institutional measures

Any supranational management system of nuclear materials appears to be completely unrealistic in the today world context. In the same way, the idea of a plutonium international bank with the possibilities of exchanges for other materials or of sales, seems presently utopic.

On the other hand, an international plutonium storage system, under the IAEA responsibility, the plutonium being only returned to the owners for the specific uses of R & D programmes and of operating or underconstruction reactor plants, appears to be a realistic solution, able to still improve the U-Pu cycle proliferation resistance. Such storages could be located next to the reprocessing plants to minimize the transportations and could be operated by the host country. The IAEA would be in charge to authorize

the plutonium restitution, after having verified the conformity of the uses to the conditions defined bilaterally between the reprocessing country and the customer country. The IAEA statute already provides for this possibility in its article XII.A.5. Furthermore, with the international controls, the IAEA will be able to check the conditions of utilization of the returned plutonium and to detect any unauthorized use, especially the eventual national storages.

The economical optimization of reprocessing plants leads to large scale unit, allowing to reprocess in the same plant spent fuel subassemblies coming from several countries. New reprocessing facilities will probably concern several countries, but their number will necessarily be limited. Then, the implementation of multinational plants *seems to be the most logical way. Against proliferation risks, this type of organisation offers sufficient guarantees provided that the measures needed to avoid any dissemination of materials and of corresponding technical knowledge are applied. To this regard, the EURODIF industrial organization is a good example. On the other hand, due to the limited number of new reprocessing plants, the choice of their location can also contribute to minimize the proliferation risks.*

*

The notions of proliferation and of international controls must be correctly defined as related to the problems of diversion by governments ; the analysis of the proliferation resistance of a given fuel cycle must take into account not only the nuclear material mass flows of this cycle but also the various possible strategies, including the nature of the risks and of the political drawbacks associated to each strategy. In these conditions, the uranium-plutonium cycle, used for fast breeder plants, including reprocessing, presents in its existing implementation, no more proliferation risk than the uranium cycle without reprocessing commonly accepted today. The sensitive points of the uranium-plutonium cycle which are the storages of the separated plutonium oxyde at the out-put of the reprocessing plant and at the in-put of the fabrication plant must be balanced with the sensitive points of the uranium cycle which are the enrichment plant, especially if separation techniques particularly sensitive, as the centrifugation, are used, and the storage of spent fuel subassemblies containing the plutonium unavoidably produced.

Various modifications can be suggested to still improve the proliferation resistance of fast neutron breeders. Only simple and realistic solutions can receive the general consensus necessary for any measure which always will be constraining. The nature of the most interesting proposals seems to be structural or institutional :

— implementation of an international plutonium storage after reprocessing, under the IAEA responsibility, the plutonium being returned only when the return conditions, defined bilaterally between the reprocessing country and the customer country, are fulfilled ;

— limitation of the number of new reprocessing plants which would have to be preferably multinational without technology transfer ;

— improvement of the cycle tightness by increasing the confinement measures at the level of the reprocessing and fabrication plants ;

— adoption of blend mixed-oxide as the physical form to return the fuel to the fabrication plants.

It would be useless to improve the proliferation resistance of the uranium-plutonium cycle without looking for similar improvements of the sensitive points of the uranium cycle. When the new chemical enrichment technique suggested by France is really going on in that direction, a large development in the world of the centrifugation separation technique represents a significant risk.

It is clearly not possible to assess the proliferation aspects of a given fuel cycle without taking into account the whole problems, e.g. the satisfaction of the energy needs, the guaranty of supply, the environment. The uranium-plutonium cycle facilitates largely the storage problem of the wastes which result mainly, in that cycle, from the reprocessing operations : satisfactory solutions, as the fission product vitrification, have been proposed. The possibility of a direct storage, for long term, of spent fuel subassemblies containing fission products, uranium and plutonium, planned in the uranium cycle, has still to be demonstrated.

Finally, the considerable advantage of fast neutron breeder plants for the uranium ressource utilization represents a fundamental asset for countries whose fossile ressources are extremely limited. The plutonium supply for fast breeders plants implies that such a reactor system can only be launched in these countries where a sufficient number of thermal neutrons reactors plants are available,

i.e. essentially in industrial countries. The implementation of fast breeders, even limited, at the beginning, to those countries, the largest energy consumers, solves the problem of the uranium ressources. For example, the natural uranium ressources of the French territory used in the uranium cycle represent approximately the energy equivalent of half the North Sea oil ressources, when used in breeders they represent twice the energy equivalent of the Saudi Arabia.

From the point of view of proliferation resistance, the uranium cycle and the today uranium-plutonium cycle present a comparable level of risks. Then, the latter can be, in the short term, significantly improved on this respect ; it shows considerable advantages as far as the environment and, especially, the energy problem are concerned. In such conditions, who could, in the present energy world context, take the responsibility, in regard to future generations, not to implement fast neutrons breeders ? ■

CSO: 5100

GOVERNMENT REJECTS PLEBISCITE ON NUCLEAR ENERGY

Rotterdam NRC HANDELSBLAD in Dutch 30 Jan 80 p 1

[Article: "Cabinet Rejects Referendum on Nuclear Energy"]

[Text] The Hague, 30 January -- The government does not see any reason during the upcoming social debate on (nuclear) energy, to make room for a consultative referendum by the whole population. The administration is afraid that because of the referendum, the necessarily far-reaching debate on energy could degenerate into a superficial approach.

In response to written questions from the House concerning the organization of the social debate on energy, the government said that to hold a referendum -- although indeed the final decision about whether or not nuclear energy should be expanded in the Netherlands would remain with the government and parliament -- would only create the appearance that the outcome of the social debate would be given a clear place in the decision, but this appearance would be deceiving.

"At that point, the government and parliament would have to deal with the results of a referendum, which would only tell them the number of votes in favor and against and the number of abstentions. Yet, they could not go along with these results without forming their own judgement, because the responsibility for the ultimate decision remains theirs."

In other words, the administration is saying: even after a consultative referendum, the government and parliament are still faced with precisely the same taks, namely the weighing of what has come out of the debate.

In principle, the government is insisting on the need for exploratory drilling in salt domes in the north-eastern part of the country and beneath the North Sea in order to test the feasibility of storing radioactive waste from nuclear plants there. However, they will wait with the actual drilling until an agreement has been reached on the whole procedure and contents of the social debate on energy.

At this moment, however, a preparatory evaluation of geological data concerning the presence of salt under the North Sea bed is already being carried out. Those salt domes beneath the North Sea are located approximately 100 kilometers north-west of Den Helder. Based on a preliminary interpretation of general seismic data, it was assumed that the top of these formations was located approximately 250 meters below the sea bed, so that at first sight the domes seemed suitable for the storage of nuclear waste. A closer evaluation of more recent data proved this assumption to be wrong. Because of this and for other reasons, the salt domes in question were rejected.

On 25 February next, the whole organization of the energy debate and the question of storage of nuclear waste in salt domes will be on the agenda in the House.

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GOVERNMENT READIES RADIO ALARM SYSTEM FOR RINGHALS AREA

Stockholm DAGENS NYHETER in Swedish 30 Jan 80 p 4

[Text] "Take it easy. Keep indoors. Wait for further information."

That is the conclusion of the radio warning that will be issued to the public if radioactivity spreads after an accident at Ringhals.

The alarm will be issued over all radio and TV channels and will be repeated every 15 minutes until further information is available.

The radio warning is part of the new emergency plan for the Ringhals area. This area was recently established by the county government of Halland County and affects around 7000 people living within a 10-kilometer radius of the power plant.

The approximately 3200 people living within a 5-kilometer radius from Ringhals could be evacuated within 6 hours after the county governor decides evacuation is necessary. The other people living within 10 kilometers of Ringhals could be evacuated within 24 hours after the decision is made. If radiation spreads beyond that point further evacuations might be called for.

The county government based the new evacuation zones on recommendations from the Radiation Protection Institute (SSI) and the Nuclear Power Inspectorate (SKI).

Just before Christmas SSI recommended evacuation areas 40-80 km from nuclear power plants and some emergency measures to counteract radiation in all counties. The national government has not yet taken a stand on this proposal.

If an accident occurs at Ringhals all those in the vicinity should take iodine tablets as soon as possible according to the new emergency plan. The county government has ordered 87,000 tablets through the Hydroelectric Agency, for immediate distribution. But the Social Services Board wants to investigate which kind of iodine tablets are best.

The iodine tablets fill the thyroid gland with iodine. This prevents radioactive iodine from causing thyroid cancer. Iodine tablets will not help prevent other types of damage caused by radiation.

According to the reactor safety report radiation can also lead to cancer of the lungs, skeleton, mammary glands and bloodstream (leukemia). It can take several decades before these cancers appear. It depends on the degree of radiation to which one is exposed.

According to the reactor safety report the radioactivity in the fuel core of a nuclear reactor right after a sudden halt measures a couple of billion Curies. For example, the highest allowable level of radioactive tritium that can be released into the water near Ringhals is 10,000 Curies in a whole year.

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PEOPLE NEAR RINGHALS TO GET IODINE TABLETS AS CANCER MEDICINE

Stockholm DACENS NYHETER in Swedish 30 Jan 80 p 4

[Text] The county government in Halland will be the first in the nation to follow the advice of the Radiation Protection Institute about providing iodine tablets for all the people living within 10 kilometers of a nuclear power plant. Within a short time 100,000 tablets will be distributed to the people living near Ringhals. The purpose of the iodine is to prevent the occurrence of thyroid cancer after an accident.

In 1978 the Radiation Protection Institute recommended that county governments review their emergency plans within the 10-kilometer limit now in force with regard to alarm systems, evacuation plans, iodine tablets, and so forth.

The county government in Halland has now ordered 100,000 tablets from the Malmo Drug Company through the Hydroelectric Agency.

Gland Too Full

One of the most critical fission products occurring in the fuel pipe of a nuclear reactor is iodine-131 which is radioactive and emits ionized radiation. Iodine is stored in the human body in the thyroid gland, a small gland up by the larynx.

By ingesting large quantities of regular iodine one can block the thyroid gland which becomes "overfilled" with iodine. The radioactive iodine that could be released by a big nuclear power accident would not be absorbed into the thyroid gland in that case but would be quickly expelled from the body.

If an accident occurs one must take two tablets the first day followed by one a day for a week. This will prevent the thyroid gland from absorbing radioactive iodine.

The 7000 people who live within a 10-kilometer radius of Ringhals will all receive the tablets. They will probably be sent out through the

mail according to Lars Lang, defense director of the Halland county government. But no precise date for issuing the tablets could be given yet.

Plans Advancing

"Along with the tablets they will receive a pamphlet explaining why the tablets should be taken and when and how to use them."

The reason why the people near Ringhals will be the first in the nation to get the tablets is that the county government is far advanced in its emergency planning, according to Lars Lang.

"We have worked on the new plan since September 1978 and we are just finishing up now. Naturally we want to be as well-prepared as possible."

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ENVIRONMENTAL AGENCY TO USE VAN AS POLLUTION DETECTOR

Stockholm DAGENS NYHETER in Swedish 5 Feb 80 p 15

[Article by Anders Olson]

[Text] A laser beam transmitted from the roof of a specially-built bus is the Environmental Protection Agency's newest weapon in the fight against environmental pollution. The bus, of which there is only one in this country so far, uses laswer-radar technology to detect air pollution at a distance of several miles.

The new measurement system, developed at Chalmers Technical College in Goteborg, will be tested over a 2-year period.

The types of pollution to be studied in the near future include dust particles, sulfur dioxide, nitrogen dioxide and ozone--types of pollution commonly associated with the burning of fossil fuels such as oil, coal and wood or wood chips.

The scientists will also study whether the new measurement method can be used to detect other types of pollution, for example lead in automobile fumes.

"We have plans to install a similar laser-radar system in an airplane in the near future. That would enable us to detect oil spills more accurately," said physicist Kent Fredriksson of the Environmental Protection Agency who helped construct the new apparatus.

Light Flashes

The measuring technique acts like this:

A laser beam is sent out into the air in the form of a short flash of light. The laser light is reflected against the contents of the air. With a telescopic system--in principle an astronomical telescope--one collects the dispersed laser light. Via an electronic system and a

computer the light is changed into an electrical signal that is later used for calculations.

James Bond couldn't have done it better.

The measurement system is primarily intended to measure emissions from chimneys. It also gives a total picture of certain kinds of pollution in urban areas, for example.

Risk Small

The technique is especially well-suited for measuring air pollution transported here over long distances. Valuable when one considers that about 70 percent of the sulfur pollution in the air above this country originated outside our borders.

The laser-radar technique is not a Swedish invention. Similar bus systems are found in other countries, for example in the United States and England.

The Swedish James Bond bus costs 1.2 million kronor and requires the services of only one man.

The laser can detect air particles at a distance of several miles. But in densely-populated areas an action radius of about 3 kilometers is anticipated.

But aren't the laser beams harmful to people?

"With the technique we are using in the bus the only risk is getting hit right in the eye by the laser beam," Kent Fredriksson said. "This could cause the same eye damage as that caused by staring directly at the sun. We have a control system in the bus that completely eliminates the risk from laser beams."

No Environmental Police

The Radiation Protection Institute has also been involved in studying the safety aspects in more detail during this 2-year period.

Kent Fredriksson: "We consider the risks to be minimal. For one thing the laser beams are transmitted from the top of the bus, 3 meters above the ground and for another the effect of the beams is very weak. A person can work beneath the beam with no risk."

The Environmental Protection Agency is not getting an environmental police system in the shape of this bus. Naturally it is a big advantage to have the measurement instruments in a mobile bus. One could arrive at

an industry unannounced to test for possible emissions. But the Environmental Protection Agency does not have the authority to send this bus out to various industries. The measurements are being made at the request of county governments.

The new laser technique also makes it possible for researchers to study in more detail combustion in motors. Cooperation in this area has been set up between Volvo and the technical college in Lund.

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PAPER ANALYZES DECLINE IN 'PRO' LINES VOTE

Stockholm DAGENS NYHETER in Swedish 2 Feb 80 p 2

[Editorial]

[Text] In December SIFO [Swedish Institute for Public Opinion Polls] found that the two yes lines in the popular referendum were supported by 54 percent of the people and the no line was backed by 32 percent.

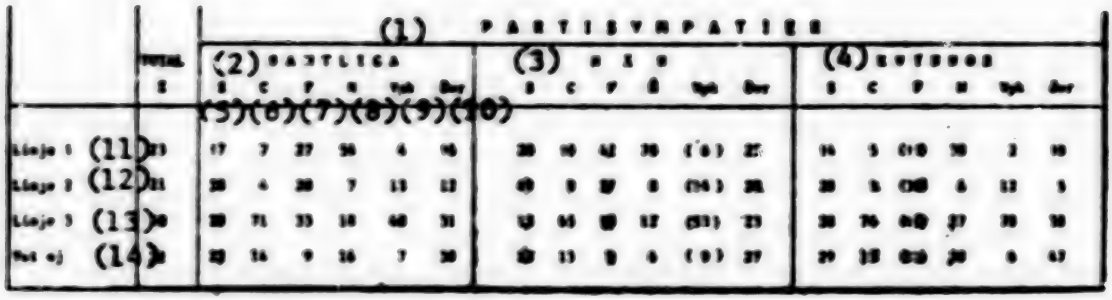
But in the January survey made by "TV Report" the two yes lines were backed by only 44 percent and the no line was backed by 30 percent. There was a striking increase in the number of undecided respondents.

Thus from December to January the yes side lost 10 percent of its support and the no side lost 2 percent. The reason why "TV Report" and most commentators declared the results a big increase for yes votes and a somewhat larger decline for no votes is that the figures were compared with an old survey--from October 1979--in which the questions were put somewhat differently.

In October the choice did not involve three different lines but one yes and one no alternative. The PUB [expansion unknown] division of Radio Sweden which conducted the survey for "TV Report" cautioned: "Even a minor change in the wording of the questions can make comparisons unreliable."

SIFO mentioned this in its December survey. SIFO found that when the question was changed from the two old alternatives--"Using" or "phasing out" nuclear power respectively--to the present three lines interesting shifts took place.

"Lines 1 and 2 got 22 percent from the 'phase out' line but Line 3 got only 6 percent from the 'use' line. In SIFO's opinion such a large shift is due in part to the technical factor of the number of alternatives and did not solely reflect a real change of opinion. There are now several ways to say yes and this attracted more votes."



Key:

1. Party sympathy
2. All respondents
3. Men
4. Women
5. Social Democrat
6. Center
7. Liberal
8. Conservative
9. Leftist CP
10. Other
11. Line 1
12. Line 2
13. Line 3
14. Don't know

Figures in parentheses based on answers from less than 50 people.

That it works like this, at least until people understand the issues a little better, is well-known from international experience. As long as there are more than two alternatives some of the voters become confused and tend to look for some kind of center ground.

One suspects that Olof Palme and others were not unaware of this when they made a half turn during the Harrisburg accident on 4 April 1979 and accepted a referendum (which they had previously rejected) and later that spring refused to accept two clear alternatives: yes or no to nuclear power.

Palme started the ball rolling by hinting that after the parliamentary election and the Harrisburg reports his party might take an even harder and quicker line on phasing out nuclear power than the Center Party or VPK [Leftist CP] and that therefore it was necessary to keep a third alternative open.

But as soon as the fall election was over and the reports issued the Social Democrats--and the Liberals--tried to combine the best of both worlds by calling for nuclear power expansion but labeling it a reduction. "Elimination is preferable, but actual expansion must come first." The road from six reactors to none goes through 12, sometime in the early part of the next century.

The point of the Social Democratic and Liberal yes line 2, which in fact and in its literal rendition on the ballot is identical with the Conservatives' line 1, is to provide an apparent distinction for the party faithful and sympathizers between the line of big industry and the employers and the "workers' own" more leftist line. In that way the total yes support can be increased under the three-choice dodge. As if by chance, the Social Democratic-Liberal line has been given number 2, the middle choice.

The decline in yes votes in opinion polls from 54 percent in December to 44 percent in January suggests that the stratagem may be backfiring. Their three-line trick has confused not only those skeptical about nuclear power and those who were undecided, which was the intention, but their own supporters as well, especially those in favor of line 2.

The two-sided and irreconcilable message that nuclear power should be phased out by almost tripling its capacity until well into the next century has not attracted as many critics of nuclear power as intended. It has obviously also irritated nuclear power proponents who don't understand the difference between 12 reactors for 25 years and 12 reactors for 25 years.

If there is more than rhetoric or pious hopes behind the statements of such stout supporters of line 2 as Lars Engqvist and Erik Grafstrom that their 12 reactor plan is really more like the no line 3 than its twin to the right they and other more authoritative advocates had better come up with concrete details very quickly.

Lars Engqvist promised on the TV program "A 45" last Sunday that within the next few weeks we would see that line 2 is really serious about phasing out nuclear power. We'll see. Are they going to come out with the SSU [Swedish Social Democratic Youth Association] line? The one that blossomed out in the mass media one day and then disappeared about closing Barseback and building but preferably not operating reactors 11 and 12? An eight-reactor line, in other words. This would be of interest, at least from the point of view of making compromises after the referendum.

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BRIEFS

URANIUM STOCKPILE--The Swedish Nuclear Fuel Supply Company [SKBF] has received permission from the government to have an emergency stock or uranium at ASEA-ATOM's [Swedish General Electric Company-Nuclear Division] premises in Vaesteraas. The uranium comes from the Ranstad mine and Canada and is first enriched in the Soviet Union. The SKBF's duties include the acquisition of fuel for the Swedish nuclear power reactors, and it also funds uranium prospecting in Sweden. [Text] [Stockholm Domestic Service in Swedish 1130 GMT 24 Jan 80 LD]

CSO: 5100

SWEDEN'S ASEA-ATOM SEES PROSPECT OF REACTOR SALE TO AKKUYA

Stockholm DAGENS NYHETER in Swedish 9 Jan 80 p 6

[Article by Gosta Karlsson: "Asea Expected to Receive Reactor Order From Turkey"]

[Text] In competition with U.S. Westinghouse, among others, Asea-Atom in Vasteras has great prospects for being able to deliver and build a nuclear power plant in Turkey.

The company has so far received export guarantees from the government corresponding to 85 percent of the investment, which involves about 5 billion crowns. Asea-Atom has now applied for a 1 billion crown credit increase.

This is reported by the People's Campaign No to Nuclear Power in an article in the first issue of its magazine, which will be issued in 70,000 copies weekly until the popular referendum.

The magazine reports that semi-state owned Swedish Asea-Atom has been placed first by the Turkish government among the nuclear power companies which submitted bids to build Turkey's first nuclear power plant at Akkuya on the Mediterranean coast.

"In November 1978 the former Liberal Party government decided to grant export credit guarantees in the amount of 85 percent of the cost of the project to Asea-Atom and Stal-Laval, which according to the plans is to build the turbine for the Turkish plant."

"This spring the three-party government is to discuss an application by Asea-Atom for a credit increase," the magazine writes.

'Fragile Protection'

As a condition for the conclusion of the deal the Ullsten government set the signing by Turkey of the nuclear arms non-proliferation treaty.

"A fragile protection in view of the fact that the treaty can be terminated after 3 months' notice and that the situation in Turkey is characterized by political unrest with frequent violent and terror actions," the magazine comments.

Managing director of Asea-Atom Lars Halle confirms to the DAGENS NYHETER the reports in the People's Campaign magazine.

"But I don't understand why they bring this up now. Nothing new has happened in these quite normal business contacts with Turkey. The request for increased export credit guarantees is only an adjustment to the development," Lars Halle says.

'Not Suitable'

The magazine Nuclear Power? No thanks! Asea-Atom's bid in Turkey in connection with Sweden's contributions to the disarmament conference in Geneva and [sic] describes it as a double standard that a semi-state owned company simultaneously initiates an export offensive with nuclear power.

Prime Minister Thorbjorn Falldin says in a comment to the DAGENS NYHETER:

"The connection between nuclear power and nuclear arms is indisputable. It is a matter of the same technology. In a situation where we in Sweden are taking a position through a popular referendum on whether to abolish nuclear power it cannot be suitable to spread this technology to new countries trough exportation."

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